C. A. Lindquist.

LECTURES ON DIETETICS

BY

MAX EINHORN M. D.

Emeritus Professor of Medicine at the New York Postgraduate Medical School and Hospital; Visiting Physician to the Lenox Hill Hospital, New York

ILLUSTRATED

PHILADELPHIA AND LONDON

W. B. SAUNDERS COMPANY

1922

MADE IN U. S. A.

PRESS OF
W. B. SAUNDERS COMPANY
PHILADELPHIA

TO

THE MEMORY OF HIS DEAR AND HIGHLY ESTEEMED FRIEND

COLONEL OLIVER HAZARD PAYNE

this book is respectfully dedicated, in
recognition of his great devotion
to the art of medicine and
to higher education.

PREFACE

It gives me satisfaction that the first edition of my Lectures on Dietetics (delivered at the New York Postgraduate Medical School and Hospital) has been exhausted, and a new issue required. The present volume has been doubled in size, so that it is almost a new book. Nine new chapters have been added, namely:

V. The Care of Digestion; VI. The Care of Digestion for the Soldier; IX. The Dietetic Management and the Allen Treatment of Diabetes Mellitus; X. The Dietetic Management of Gout; XI. The Diet in Diseases of the Kidneys; XIII. The Diet in Operative Cases; XIV. Subcutaneous and Rectal Alimentations; XVI. Indications for Artificial Nutrition; XVII. Preparation of Food for Invalids (The Diet Kitchen).

The reader's pardon is asked for some repetitions in the text, due to the fact that some of the incorporated lectures have been delivered at different periods of time and not as a continuous

course. The points mentioned are, however, usually of importance and will by repetition make a more lasting impression and thus perhaps be of greater use.

It is hoped that the present book, like its predecessor, will contribute toward the spread of knowledge of Dietetics in this Country.

MAX EINHORN.

NEW YORK CITY,
August, 1922.

CONTENTS

LECTURES ON DIETETICS[1]

LECTURE 1

THE PRINCIPLES OF DIET AND NUTRITION

I propose to give a few lectures on the subject of diet. Diet plays so important a part in health and disease that every physician should be well informed on all points pertaining to it. It should really form the basis of every medical study. It is the A, B, C of medicine. We cannot live without food and we cannot treat anyone without a certain dietary; and if we understand all the relations of diet a great deal can be accomplished by it alone in the treatment of disease, without the aid of medicine. Diet comprises all the questions relating to food, and food forms the basis of all animal life. Food contains all the substances found in the living organism, because the body develops upon it;

[1] Lectures I, II, III and IV on Dietetics have been delivered at the Postgraduate Medical School and Hospital and have appeared in the *Postgraduate Journal* of July, August, September and October, 1913.

it grows up from the little baby to the big organism. Nothing is added to the body excepting what is derived from the food.

On the other hand, food contains only the substances found in the earth. Everything that we eat, animal or vegetable, originated in the soil under one form or another. That means that whatever we have in our bodies comes from the earth. The Bible says: "From earth you are made and to earth you go." Nowadays we speak of the different elements found in the body. We have analyzed the latter and know that there exist the most varied substances: carbon, nitrogen, hydrogen, oxygen, calcium, magnesium, iron, phosphates, sulphur, etc.; but in the end the old philosophers were right. If we should take earth, even if we have all the elements, carbon, calcium, phosphate, etc., we could not accomplish anything with it, but after these substances have been changed by living matter and developed in the forms in which they exist in either animals or plants then it is fit for our organism. It has first to undergo this radical change through living matter.

Thus far we have not been able to accomplish these changes artificially; that is, we cannot put

inorganic matter together so as to bring it into life. We require another living medium to accomplish this change. Every living cell must originate from another one. So living plants develop from the seed into plants. There must first be something that is alive to bring forth new life. We know nothing yet of how inorganic matter develops into an organic being. It may be that the great chemists and physiologists think it originated of itself, but we do not know about that for the present. So far as we can tell, nothing is developed of itself, but every animate being is developed from some living individual.

Our food, then, consists of either animal or vegetable matter. We find some nations living principally on animal diet, and some animals living on animal food exclusively; others live on vegetable material alone, and some nations live principally on vegetable food. That shows that either of the two is feasible,—that persons can live either on vegetable food alone or on animal food alone. If one should ask which is the better way, it is generally admitted that a mixed diet is the best for mankind. It has been shown that those nations which subsist on a mixed diet, taking both animal and vegetable

foods, have accomplished most in the way of progress. Those nations which live exclusively on animal diet, such as the Esquimaux, or the peoples to the far south where vegetable material is rare and who live almost exclusively on the fish and animals which they hunt and kill have not accomplished very much in the way of progress. On theother hand, the peoples of India, China, and Africa live mostly on a vegetable diet, and these nations have not accomplished very much either, in the way of progress. It is possible to live in either way, but as a whole, physiologists have decided that a mixed diet, combining the two forms of food material, is the best to develop the mental faculties to the highest degree.

It has always been known that you cannot live without food; if you do not take in food, the body loses weight, and finally dies; but until recent years not much has been known of the exact amount of food required by nature to maintain life and to keep the body in good condition. The amount is almost mathematically prescribed, and in recent years this amount has been determined. This has been learned as follows: First, it has been determined in a gen-

eral way how much food grown persons require. It is noted how much one person, a second, and a third eat for breakfast, dinner, and supper. This is carefully written down, and then the average amount consumed is calculated, and so we know about what amount of food is required by normal persons in health. That gives a fair indication of how much is needed.

Now, before going to the amounts required, I will say a few words about the different classes of food. While every diet must contain all the elements necessary for life, the food has been divided into three large classes, because they all contain more or less of the elements necessary for life. These three groups are the proteins, carbohydrates, and the fats. Among these are also found the so called "vitamines," contained in milk, eggs, cereal, green vegetables, and fruits.

Ejkmann,[1] C. Funk, Th. B. Osborne,[2] Lafayette B. Mendel,[3] Hess[4] and Goldman have done meritorious work along the vitamines and their relation to deficiency diseases. While the exact chemical composition of the vitamines has not,

[1] Ejkmann: Virchow's Arch., 1897, 148, p. 523.
[2] Th. B. Osborne: N. Y. State Journal of Medicine, July, 1920.
[3] L. B. Mendel: N. Y. State Journal of Medicine, July, 1920.
[4] Alfred Hess: N. Y. State Journal of Medicine, July, 1920.

as yet, been established, they are divided into the following 3 varieties:

1. The fat soluble A. vitamine (or the antirachitic factor), contained principally in butter, the maize kernel; carrots; sweet potatoes.

2. The water soluble B. vitamine (or the antineuritic factor), contained in yeast, beans, cabbage, cane sugar, yolk of eggs, oranges, lemons, grape fruit.

3. The water soluble C. vitamine (or the antiscorbutic factor) contained in cabbage, tomatoes, oranges, and milk.

All foods contain one or two, or three of the above designated substances, namely protein, carbohydrate, and fat. In order to find out the amount of food necessarily required for living, the physiologists have calculated how much of these three different classes we require, not saying how much bread, meat, potatoes, etc., but how much albumin, how much carbohydrate, or how much fat is required for a grown person each day. It has been found that a grown person uses up each day about:

120 gm. of albumin = oz. IV
500 gm. of carbohydrate = oz. XVII.
60 gm. of fat = oz. II.
2½ to 3 quarts of water.

Besides these three essentially nutritive substances we utilize condiments and some alkaloid and alcoholic beverages (accessory foods). The condiments (pepper, table salt, onion, mustard, cinnamon, nut meg etc.) serve to increase the taste of the food and make it more savory. The latter (coffee, cocoa, tea, beer, wine, etc.) exert a stimulating effect and diminish the depressing act due to the process of digestion. While the alkaloidal substances (theobromin, caffein (trimethylxanthin) are as such without nutritive value, the alcohol must be counted as a nutritive substance. It furnishes 7 Cal. per 1 gm. If not taken in high concentration and in too large quantities it often helps nutrition, especially in diseased states.

Water contains many mineral ingredients not found in the food. While protein must exist in the food which any individual requires for living, in some way or another, and cannot be dispensed with, either the carbohydrate or the fat can be omitted without much injury. This is to say, one of these groups can replace the other without injury to the individual for a while, but the albumin is essential. The reason for that is that the protein is the foremost substance

in the body. Any tissue that is used requires albumin to build it up again. The fat which is taken in helps to build up the organism; it also produces heat. Heat is also furnished by the other substances, by the protein and the carbohydrates, but as a tissue builder the protein is necessary. From protein the organism can make glycogen, fat, or muscle, but the body cannot make protein out of the carbohydrate or the fat. That is why protein is the most essential substance.

Now the physiologists, especially Rubner—who was here not long ago—who has made a great many studies and deserves to be remembered, have tried to ascertain in what degree these substances can replace each other, and found that they do it corresponding to the amount of heat which they develop. Every kind of food taken into the body is oxidized in the system. We take in oxygen with the air, and the nutritive substances become oxidized. The more carbon a special kind of food contains, the more oxygen it can bind. The more carbon in the food, the more heat it can develop in burning up. The burnt up or oxidized compounds leave the body in the

form of CO_2 and H_2O, through the lungs and kidneys.

It has been found that one gram (15 grains) of food material, if oxidized (burnt up) develops a certain amount of heat. I will explain how that is calculated. It has been arranged by the scientists to measure heat in this way: The idea is to know exactly how to estimate the heat. They have agreed to take as the measurement for one heat unit the amount of heat which is sufficient to increase the temperature of one cubic centimeter of water (16 grains) 1 degree Celsius. This is also designated as a small calorie (cal.).

In speaking of the heat values of food, however, we use great heat units, or great Cal. That means the amount of heat which is sufficient to raise 1 liter (1 quart) of water 1 degree C. Returning to the food values, it has been found that one gram of protein is sufficient to develop 4.1 Cal. In speaking of food calories, we do not say "great heat unit," or great Cal., but we mean that. It is written Cal.

Protein, 1 gm. develops.....	4.1 Cal.
Carbohydrate, 1 gm. develops...	4.1 Cal.
Fat,[1] 1 gm. develops	9.3–9.5 Cal.

[1] See.: C. A. Ewald: Diät und Diätotherapie. Berlin, 1915, p. 202.

Notice that the fat develops more than double the amount of heat, as compared with the others.

The way foods should represent each other is by their caloric value, excepting that we cannot eliminate protein. A certain amount of protein must be in any food,—but we can combine protein with carbohydrate (as present in most vegetable foods), or we can have protein and fat as represented by animal foods. If we should have someone live on protein and fat, we would say that the fat should be less than half the amount of carbohydrate required, for it contains so many more heat units.

Now it has been found that a man requires for one day about 2400 calories or on an average 30–40 Cal. per kilo an hour.

A man doing a considerable amount of work ordinarily consumes about:

		Caloric value
120 protein	= 120 gm. × 4.1 =	492.0
60 fat	= 60 gm. × 9.5 =	570.0
500 carbohydrate	= 500 gm. × 4.1 =	2050.0
		3112.0

It has been found generally that a grown person requires about 2500 heat units each day, or food which develops that number of heat

units, when doing a moderate amount of work. If he works hard, he requires more, 3000 calories, or more. If he is in bed, he requires less. I have found that a patient in bed requires much less; he can exist on 1800 heat units without losing much flesh.

Smaller organisms require more heat units per kilo weight. This is due to their proportionately increased surface ratio, which increases the loss of heat. Infants require more than double the amount of calories per kilogram weight of the grown. This must be ascribed to the comparatively larger surface of the young and the act of growing. According to Heubner and Rubner[1] the newborn (from the 2nd to the 18th week) consumes 100 Calories per kilo a day, later somewhat less. An artificially fed infant requires 120 Cal. per kilo a day.

Increased work requires an increase of food. The latter must always be much greater than the heat equivalent of the actual work done. Usually about one fifth of the added food will be furnished as work, the rest being dissipated as heat. It is in harmony with this principle

[1] Heubner & Rubner: Leitschr. f. Biologie, vol. 36, p. 1, and vol. 38, p. 315.

that soldiers receive much higher food rations in war-time than in peace. Thus the Caloric value of the Soldiers' food ration is as follows:

	In peace	In war
Great Britain	2,946	3,987
Germany	2,592	3,613
		4,213
France	2,310	3,079
		3,413

The U. S. garrison ration calls for 4.600 Calories daily, and the modified garrison ration for 4,800. The actual food intake in the training camps, as gathered from the data of 87 messes, shows a consumption of 4,000 Calories a day thus distributed between the groups of nutrients: proteins, 14%; fats, 30%; carbohydrates, 56%. (See editorial: "The Food of the Army." Journal American Medical Association, June 15th 1918).

According to Murlin[1] the British army allows one pound of meat per man a day, the French army ¾ pound, while the U. S. army furnishes 1½ pounds.

[1] J. R. Murlin: Some Problems of Nutrition in the Army Science, 1918, vol. 47, p. 495.

COMPOSITION OF THE MOST COMMON FOOD SUBSTANCES

I. Dairy Products

	Protein, per cent	Fat, per cent	Carbohydrate, per cent	Calories, per 100
Cow's milk	4.0 to 4.3	3.0 to 3.8	3.7	64
Cream	3.61	26.75	3.52	276.01
Butter	0.5	90.0	0.5	837
Whey	0.5	0.3	3.6	7.30
Buttermilk	3.0	1.3	3.0	37.5
Kumyss (of cow's milk)	3.35	2.07	0.7 lactic acid 1.9 alcohol 0.8 carbonic acid	32.99
Cheese (cream)	25.0	30.0	3.0	394
Cheese	33.0	9.0	5.0	240
Egg	12.5	12.0	0.5	165

II. Meats and Game

	Protein, per cent	Fat, per cent	Carbohydrate, per cent	Calories, per 100
Beef (fat)	17.19	26.38	....	315.81
Beef (lean)	20.78	1.50	....	99.15
Veal (fat)	18.88	7.41	0.07	146.61
Veal (lean)	19.84	0.82	....	86.97
Mutton (very fat)	14.80	36.39	0.05	399.31
Mutton (leaner)	17.11	5.77	....	123.81
Pork (fat)	14.54	37.34	....	406.88
Pork (lean)	20.25	6.81	....	146.36
Ham (Westphalian)	23.97	36.48	1.50	453.69
Sweetbread	22.0	0.4	....	93.92
Pulverized meat	64.5	5.24	2.28	322.53
Poultry	22.0	1.0	....	100
Spring chicken	18.49	9.34	1.20	167.59
Duck (wild)	22.65	3.11	2.33	131.36
Squab	22.14	1.00	0.76	100.07
Game	23.0	1.0	....	103.60
Hare	23.34	1.13	0.19	107.08
Venison	19.77	1.92	1.42	105.44

III. Fish

	Protein, per cent	Fat, per cent	Carbohydrate, per cent	Calories, per 100
Pike	18.5	0.5	0.75	83.57
Carp	20.61	1.09	....	94.64
Shellfish	17.09	9.34	....	156.93
Salmon	15.01	6.42	2.85	132.93
Sardellen	22.30	2.21	0.45	113.83
Oysters	4.95	0.37	....	24
Salt herring	19.5	17.0	0.5	
Caviar	28.04	16.26	7.82	

IV. Cereals and Vegetables

	Protein, per cent	Fat, per cent	Carbohydrate, per cent	Calories, per 100
Sago	0.5	traces	86.5	356.70
Wheat flour	8.5	1.25	73.0	345.78
Rye flour	10.0	2.0	69.0	342.50
Wheaten bread	6.0	0.75	52.0	245
Rye bread	4.5	1.0	46.0	216
Roll	6.82	0.77	43.72	213.87
Zwieback	9.5	1.0	75.0	356
Cauliflower	2.0 to 5.0	0.4	4.0	35
Carrots	1.04	0.21	6.74	33.85
Asparagus	2.0	0.3	2.5	21
Rice	5.5	1.5	75.0	348.10
Beans	19.5	2.0	52.0	311.75
Peas	19.5	2.0	54.0	319.95
Potatoes	1.5	....	20.0	88
Oatmeal	12.5	5.26	66.77	338.80
Barley meal	8.31	0.81	75.19	323
Spinach	3.49	0.58	4.44	38
Pickles	1.02	0.09	0.95	

V. Soups and Beverages

	Protein, per cent	Fat, per cent	Carbohydrate, per cent	Calories, per 100
Milk soup with wheat flour	5.0	3.25	15.0	112
Meat broth (ordinary)	0.4	0.6		
Meat juice (pressed)	6.0 to 7.0	0.5		
Beef tea	0.5	0.5		
Leube's meat solution	9.0 to 11.0 albumin +1.79 to 6.5 peptone			
Barley soup	1.5	1.0	11.0	60.96
Malt extract	8.0 to 10.0	....	55.0	258.30
Rice pap with milk	8.8	3.5	28.6	182.61
Coffee	3.12	5.18		
Tea	12.38			
Beer	0.5	5.25	0.3	
Porter	0.7	6.0	0.3	60

VI. Fruits

	Free acid, per cent	Protein, per cent	Fat, per cent	Carbohydrate, per cent
Apples	0.82	0.36	....	7.22
Pears	0.20	0.36	....	3.54
Plums	1.50	0.40	....	4.68
Peaches	0.92	0.65	....	7.17
Grapes	0.79	0.59	....	1.96
Strawberries	0.93	0.54	0.45	1.01
Chestnuts	....	5.48	1.37	38.34
Sugar cane	....	....	....	3.40
Honey	....	1.20	....	5.28

VII. Food Values in Household Measures. (Calories)

Foods as eaten	Actual amount	Household measure	Calories
Dairy, milk	8 oz.	A glass	160
Skimmed milk and buttermilk.	8 oz.	A glass	80
Cream { thin, 20 per cent / thick, 40 per cent }	15 gms.	A tablespoon	30
		A tablespoon	60
Condensed { sweetened / unsweetened }	20 gms.	A heaping teaspoon	70
		A heaping teaspoon	35
Butter	10 gms.	A pat or ball	80
Cheese { Cream / Skim-milk / American }	15 gms.	One-inch cube	65
		One-inch cube	45
		One-inch cube	70
Eggs, whole	50 gms.	One	75
Eggs, yolk	15 gms.	One	55
Meat and fish (cooked):			
Beef tea, clear soups	5 oz.	A teacup	20
Fish { lean (cod, flounder) / fat (shad, salmon) }	50 gms.	A heaping tablespoon	35
		A heaping tablespoon	105
Meat { lean / medium fat / fat }	50 gms.	A medium slice	70
		5 × 3 × ¼ inch	150
			200
Oysters, medium size (raw)	16 gms.	One	8
Cereals and vegetables (cooked):			
Bread, white or graham	25 gms.	One slice, 4 × 4 × ½	70
Vienna roll	40 gms.	One	115
Crackers (uneeda)	7 gms.	One	30
Cereals, cooked, moist	40 gms.	A heaping tablespoon	35
Cereals, eaten dry	5 gms.	A heaping tablespoon	20
Shredded wheat	30 gms.	One	110
Gruels (cereal)	8 oz.	A soup plate	75
Thickened or cream soups	8 oz.	A soup plate	160
Macaroni	25 gms.	A heaping tablespoon	25
Potato, boiled or baked	95 gms.	One medium	90
Potato, mashed	35 gms.	A heaping tablespoon	40
Rice, boiled	30 gms.	A heaping tablespoon	35
Corn, canned	35 gms.	A heaping tablespoon	35
Peas, fresh	35 gms.	A heaping tablespoon	40
Lima beans, canned	25 gms.	A heaping tablespoon	20
Squash	35 gms.	A heaping tablespoon	20
Fruits, apple, pear	120 gms.	One medium size	75
Apple sauce	45 gms.	A heaping tablespoon	70
Banana	100 gms.	One medium size	100
Orange	130 gms.	One medium size	70
Strawberries	100 gms.	A medium saucerful	40
Dried figs, dates, raisins	100 gms.	A medium saucerful	350
Fruit jelly, sweetened	50 gms.	A heaping tablespoon	160
Desserts, custard	40 gms.	A heaping tablespoon	55
Ice cream	40 gms.	A heaping tablespoon	135
Sponge cake	20 gms.	A slice 2 × 4 × ½ inch	75
Pudding (rice, tapioca, bread).	45 gms.	A heaping tablespoon	80
Alcohol	12 gms.	A tablespoon	85
Whiskey, brandy, etc. (50 per cent)	1 oz.	A small wineglass	85
Wines (8–25 per cent)	1 oz.	A small wineglass	15–50
Miscellaneous, sugar	8 gms.	A heaping teaspoon	33
Honey	10 gms.	A heaping teaspoon	33
Olive oil	4 gms.	A teaspoon	37
Almonds, shelled	10 gms.	A heaping teaspoon	65
Cocoa powder	10 gms.	A heaping teaspoon	50

[1] Arranged after Franklin H. White of Boston, Mass.

Food tables have been prepared indicating now much albumin, carbohydrate, and fat each food article contains, and by using these you can know how much of each of these substances is contained in bread, meat, or vegetables and you can make out how many heat units they will develop. On the preceding pages will be found several tables of the composition of the most common food substances, showing also the heat units they contain. (Tables I–VII.)

Usually we find that all food articles contain two or three of these substances, proteins and carbohydrates, or carbohydrates, fats, and a trace of protein, etc. Animal foods contain principally protein and fat; and the vegetable foods contain carbohydrates and protein and very little fat.

On the whole, in the average diet, people take the greater amount of protein from animal food, and the greatest amount of carbohydrate from the vegetable kingdom. The physiologists advocate taking a larger amount of protein from plants. Two-thirds of the protein ingested should be from vegetable food, and only one-third from animal food. In the majority of instances in this country and England this point

is not heeded, and people take protein principally from animal food,—eating meat three times a day. This is easy for the organism, as it is not bulky and can be eaten quickly. It is the most expensive article of food, but it is not always the best, and it is apt to bring on conditions which are not good,—gouty tendencies, and disturbances of the liver, etc. For healthy living, it is rather better to choose the proteins to a great degree from the vegetable kingdom.

Next lecture our subject will be the digestibility of food, and we will see how to estimate the digestibility of what is eaten, and we will take up the subject of diet in health and diet in disease.

LECTURE II

THE DIGESTIBILITY OF FOODS, AND THE DIET IN HEALTH AND ACUTE DISEASES

We will start to-day with the subject of the digestibility of food. How can we estimate which food is easy to digest and which is not? When Beaumont had a patient with a gastric fistula, he thought he would find out about that. For at that time it was considered that the stomach was the main organ of digestion, and he thought that if food was found in the stomach after a long time it would indicate that the digestion of that food was not easy. On the other hand, he thought that if a certain article of food leaves the stomach in a short time, it would indicate that it was easy to digest. So, having this patient with a gastric fistula, he thought he would watch when the stomach emptied after certain articles of food, and he made out a scale of the digestibility of food accordingly.

In recent years, now that we are using the stomach tube so frequently, physicians do not

need to have a patient with a fistula in order to watch the time when the food leaves the stomach, but can empty or wash out a stomach after a meal and examine its contents. This has been practiced by Leube, and later by Penzoldt. They took healthy individuals, medical students who were willing to take test meals and then have lavage practiced, or a tube introduced, to find out whether or not certain foods had left the stomach. Penzoldt has arranged a table showing what time certain articles of food require for digestion in the stomach.

Most physicians think that the shorter the time required for digestion in the stomach, the easier the digestion of that article. On further reflection, however, one can see that this is not a good gauge to go by. In reality, the main place for digestion is not the stomach, but the small intestine. The stomach prepares the food, but the actual digestion, for the greater part, takes place in the small intestine, and there the absorption occurs. Many substances leave the stomach without any change at all—the fatty substances, for instance. According to my experience, the main place for the digestion of meat is not the stomach but the intestine. The

muscle fibers become swollen in the stomach, but they don't disappear. Connective tissue is one of the substances that are absorbed in the stomach. Then, we have some of the starchy substances which have already changed into sugar, which likewise are absorbed here. But everything else leaves the stomach, and enters the small intestine for further changes there. So the time the food remains in the stomach is not enough of a guide as to its digestibility.

Another plan of judging of the digestibility of food is to see whether it leaves a residue in the digestive apparatus or not—that is, whether it entirely disappears. If a certain article of food leaves a great deal of residue, and part of it passes through the entire digestive tract, it cannot be considered very digestible; while food that leaves no residue must be considered easy of digestion. So another scale has been made out according to that.

As a general rule, we can say that all animal food leaves less residue and is, in a way, more digestible than all vegetable food. All vegetable food leaves more residue, no matter what it is: seeds, nuts, etc., those vegetable foods rich in protein, that come in prepared forms—

flour, meal,—leave less residue than those materials which represent other vegetables, such as roots—like potatoes—or leaves and stems that contain a great deal of cellulose matter; also most foods that grow on trees contain a great deal of cellulose, which leaves a large amount of residue.

Of animal foods, it has been found that those meats that contain less fat are easier of digestion than those that contain a considerable amount of fat. For instance, pork takes a longer time in the stomach and also leaves more residue than beef; so you have another point on which to judge of the digestibility.

Another way of estimating the digestibility of food is by its physical character. All food before being absorbed must be changed into a liquid form. The organism cannot take up any substance unless it is in a gaseous or liquid form, or emulsified. Solid substances cannot penetrate the tissues. If we have to deal with foods that are liquid from the start, we can judge that their absorption will be much easier than that of solid substances which have to be changed into the liquid form. So you can make out a scale of the digestibility of foods according to their

physical characteristics—whether or not they are easily changed into liquids. In this way we will have in that group which is more easily digested, or Group I, liquid food; milk, broths and gruels; eggs beaten up in milk —emulsified— are easy to digest; also beef juice—the juice pressed out from the meat. Group II; liquid at body temperature: fruit jellies and meat jellies, calves-foot jelly, ice cream that melts at body temperature, butter, all these are easily digested.

Group III. Foods that are easily broken up into fine particles beforehand, such as mashed potato; or where some mechanical movement is necessary to divide the food into fine particles, already prepared, mashed, etc., powdered meat, all mashed vegetables, purees; soft boiled and poached eggs belong to the same group; bread and crackers dried and pulverized, toast and bread cut up or ground up nicely and put into some liquid.

Group IV. Foods that are not easily broken up, but still change easily and do not present too much resistance to mechanical division, such as bread, boiled potatoes and vegetables not made into purees; foods such as sweetbreads,

calves' brains, and fish are a little lighter than other kinds of meat, like chicken and chops, and are easier to mash up and chew.

Group V. Where the division is a little harder. Here we have the meats that have stronger fibers. Boiled lobster does not divide up so quickly as tender meat; fruits, where a great deal of chewing is required to break them up.

Group VI. This is the hardest group—salads, raw vegetables, cheese, and foods that contain a great deal of sulphur—such as cabbage, etc.

According to these lines you can see whether a food is easily digested or not, and if you act according to this scale you will see that it corresponds with the other scales mentioned before.

DIET IN HEALTH

Now, speaking about diet in health, is it good for healthy persons to abstain from food substances that are not easily digestible? There are a great many persons who think that if they avoid all kinds of hard foods, and live on the finest articles, milk, eggs, soups, etc., they are better off and do not get sick, but in my opinion that is not the right way to live. It is rather advisable to harden the system. If you live on only light diet for some time, and then on

some occasion have to take something else, you are liable to get sick; the digestive tract is not accustomed to it. In normal conditions, it is best to have a liberal diet and not to select foods that are easily digestible. You should rather mix your diet; take some substances that are more difficult to digest, and accustom yourself to a variety of food. If a man has accustomed himself never to take salads and once in a while has to take some raw foods, he is likely to get sick and need some medicine. People in health should have a liberal diet, and should include some substances that are not so easily digested.

Should people eat fast or slowly? Here again the golden rule is in the middle. The food should not be eaten too fast, nor yet too slowly. One reason for that is that if you eat too slowly and are used to it, and then some day have to hurry and take a meal a little more quickly, you will get sick. Again, if your appetite is not so good, and you are used to eating slowly, you will get tired of your food and stop in the middle of a meal. I have found that severe conditions develop sometimes from eating too slowly, especially in persons who are not so well. They are imbued with the notion of eating

slowly, and counting so many times before swallowing; they grow tired of eating, and their appetites are not good, and instead of eating a good dishful they eat only a few mouthfuls; so they are not well nourished, and become nervous, etc.—all due to that habit of slow eating.

Fast eating, also, is not good. Some very disagreeable conditions develop from swallowing the food too quickly, not chewing it up and masticating it properly. It may go on for a while without apparent harm, but after a while some obnoxious conditions develop, perhaps some catarrhal condition or a functional disturbance of the digestive apparatus. So take time for your meals, but do not overdo it. Live sensibly and have a good meal, and have a little conversation with your meals, and have to wait for one dish and then another. Once in the country I asked a lady to go out for a ride with me. She said: "Before I go, I would like to have a glassful of milk." I said: "Certainly." But instead of taking a glassful of milk and drinking it, she sipped and sipped, and took a half hour to drink the milk. She suffered from headaches, and then she became my patient. She consulted me, and I knew right away what

was wrong. I tried to convert her to another way of living, and succeeded, and she is much better off now. That was an instance of the evil of slow eating, and how I discovered the cause.

How many meals should a normal person have? Should we eat twice a day, three times a day, or five times a day? There are people who do all of these ways and enjoy perfect health. This question cannot be answered off-hand. I think the customs of the country in which one lives are the best guides to follow. Here in America, people eat three times a day, as a general rule—a good breakfast, a good supper—morning and night. At noon time, they are away from home, and have only a light luncheon. Two good sized meals and one small one between. The reason for that is that they are not at their homes, are far away, and have to be satisfied with a little something at the business hour—so that is the best for them. They have their heavy meals at home, prepared to suit them, and in the middle of the day they take something to meet the requirements. People in the country, or who are at home and do not have to leave the house for their meals, usually have a smaller

meal in the morning, take a good luncheon or dinner in the middle of the day, and have another small meal in the evening. Usually the morning meal is the smallest, the one in the middle of the day is the largest, and the second in size is the supper—so for them, that is all right. In Germany, they are used to taking a very small breakfast—only coffee and a roll. They eat no eggs then, but they have another breakfast at ten o'clock or half-past ten. Prof. Virchow used to lecture at 11 o'clock, and he came into his lecture room about half after ten and had a sandwich and a glass of beer. That was his regular custom. That is their way. They take something in the morning, and then something additional a little later; then have luncheon, and again something in the afternoon at half-past three—coffee, with a little bread. They have more time there and are more sociable. They go to the cafés and restaurants, and spend some time there, and have a little chat, and then go on their way. Whether you like it or not, that is an easy way. Then they take their supper, and go out again, and later in the evening they go to a beer garden, and take a bite again. So they eat perhaps six times a day.

That is not obligatory, but it is customary, and it is all right. It has a tendency to fatten them up. On this account you perhaps find more fat people in Bavaria, and Germany, than here. That used to be the way when I lived there, and it is an easy way of living. Frequent eating and doing less work tends to corpulency, and that is what we find. In this country corpulence is not a frequent disease. Not one of you here has that characteristic. The different mode of living and eating is the reason for it. In Europe, you might find half a dozen or more fat persons among such a number.

The best way is not to change the custom of the country, but to do what others do. The majority rules. Don't try to do better than the others. Go along with them and you will be all right. That is the best rule.

DIET IN DISEASE

We may for our purpose divide all diseases into two classes, for in these groups the diet is quite different. One, in which the disease is of an acute character and lasts only a short while. In the second group, we have to deal with

chronic conditions, or diseases lasting over long periods.

We will start to-day with the diseases of short duration. Here the main point is to see that the digestive tract is not burdened with much work. The principle of rest plays the greatest part in any disease, especially in regard to diet. In any disease, no matter what—of the stomach, liver, kidneys, lungs—the organism requires rest. You have, for instance, a patient with pneumonia. He has been all right, right along, but now he is attacked with pneumonia. Here it would be wrong to prescribe plenty of nourishment. He does not need it, and you would only make him worse if you force him to take food. Nature has provided for that, and gives hints in regard to the method of procedure. When a man is taken sick, he suddenly loses his appetite and has an aversion for food, and tells you to leave him alone. That is what nature does, and it is the correct way. His body is in good nutrition, and no harm is done if in that period of sickness—which usually lasts from three to six or seven days—he does not have food. His organism has enough material in it to utilize during that period of emergency. It is rather best

to act on the principle of rest and not to burden the system with food that is not essential. Keep such a patient quiet in bed, with cold ablutions of the body or something of that sort; and left alone, the organism has a good chance to fight the disease. This principle prevails everywhere in all diseases. The patient may lose say eight or ten pounds during the disease, but as soon as the period of fever or the acute stage is over, the appetite will come back, the patient is hungry—even more so than formerly—he eats more and quickly replaces what was lost.

But while it is not essential to introduce much food into the organism during the period of acute illness, it is essential to look out for the amount of fluids in the system. You must not say: "Give the patient nothing"—that is wrong; but you must see that he gets enough water. That is a very important point. The reason for that is that a man in good condition—a normal individual, a healthy man—if deprived of food but supplied with water, can live for twenty or thirty days upon the material supplied from the body. There are professional starvation men who practice that, and have been able to live thirty or forty days on water alone—

using their bodies to live upon. At the end of that time, they resume eating and are again all right.

If in addition you take away water, however, the period of life is shortened. One can live only three or seven days at the utmost without water. Why cannot a man live a little longer? He has enough in his body to live upon; there is enough flesh and fat in the body to live upon, and yet he dies. The reason for that is that there is a shortage of water, of fluids, in the system. We use up a great deal of fluid, by respiration, perspiration, by excretion through the kidneys, etc. We lose at least two or three quarts of fluids daily in this way. If it is not there, the organism takes it from the fluids in the system, the tissues dry up, the blood thickens, and the man dies. In two days we lose six quarts, that is twelve pounds from the fluids. Then what happens? There is plenty of nutritive substance in the organism, but the blood has become thickened, the capillaries cannot work, the substances which are in the system cannot replace those which are needed, the traffic is cut off, the rivers are dried up, the vessels cannot go, and the man dies. He dies not so much from lack of food material as from lack of fluids.

In the acute diseases, the loss of fluids is increased. During fever a patient, instead of losing three quarts of fluid a day loses four or five. If you do not see that the patient drinks, or that something is given him to replace the loss very quickly, there will be something wrong. So, while it is not necessary to introduce much food into the system during an acute illness, the necessity of introducing fluids is increased.

There is another reason why fluids are essential during the acute stage of disease. In most instances we have to deal with infections, and there are toxic substances developed through the system by bacterial action. These have to be removed from the system, and we can do this quickly if we flush the system. Give them more water than they need. They have to pass more water, and the water must reach the circulation first before it is carried off, and that washes out the system.

I will give you one instance of this, for I think that those things which really occur impress us more than anything else, so I will tell you of something that happened to me. When I was a little boy, I was in Russia, visiting some

relatives, and cholera developed there. They were anxious to send me home, as was quite natural, and the carriage was waiting for me downstairs, so I put on my overcoat; but while I was getting ready to go down, I collapsed and was attacked with the cholera, and became unconscious, vomited, etc. I had the real Asiatic cholera, so I was put to bed. I could not talk, could not do anything. There were several physicians in attendance, and they thought I was going to die. They did not give me anything; at first I was kept without anything, but when I returned to consciousness I was very thirsty, as was quite natural, but the two physicians thought differently. They called in a third physician, and he said "Give him water; if he is thirsty, let him drink." So they put a big pitcher of water next to my bed, and I emptied it once, a second, a third time. I was drinking all the while. After a period of a week or ten days, during which I was almost dead, I began to recuperate, and you see I am still living. I think that water saved my life at that time. I am quite sure that if it had not been given to me I would not have had a chance of recovery. I want to impress upon you the necessity of

giving liquids. If a patient is thirsty, let him drink. But supposing he is not thirsty, is apathetic, does not want anything, lets himself go. Is it necessary to remind him? I think it is. You must look out, even then. The fluids should be given; he should be encouraged to drink; give lemonade, Apollinaris water, barley water, etc., make him drink. If you cannot accomplish that, introduce the water into his system in some other way; through the bowels is a very good way. Give him saline injections. If he does not keep that and is very weak, and does not drink, and there is need of fluid, you can give injections subcutaneously, under the skin, but see that there is enough fluid in the system, especially in such conditions as diarrhea, vomiting, etc.

The principle of introducing liquids into the system to cover the loss from perspiration, etc., is of the greatest importance. While, as I have said, it is not essential to look out for the nourishment of patients in these acute illnesses, there are exceptions to this rule. For instance, you may have to deal with an elderly individual, say a patient of seventy or seventy-five. Usually such patients are not so very

well nourished, people of this age usually grow thin, and cannot stand much loss, and there we cannot neglect to pay attention to the food, even in that short period, but see that they take food that is easily digested. Give them milk, say every two or three hours, decoctions of barley water, etc. Long ago Hippocrates understood this, and gave his patients the ptisan, which is a decoction of barley water and sugar. Sugar is a good nutritive material. He treated febrile cases by cutting off food and giving them barley water and honey.

For the next lecture we will take up the second group of diseases, and we will consider first the subject of diet in more prolonged acute diseases, such as typhoid fever, etc., and in chronic diseases.

LECTURE III

THE DIET IN ACUTE DISEASES OF PROLONGED DURATION AND IN CHRONIC DISEASES

Proceeding with the subject of diet, we will to-day take up the question of diet in typhoid fever, which is one of the acute diseases that often lasts for a long period of time, and requires special attention. In former times, up to about seventy-five years ago, it was the tendency of the medical profession to withhold nourishment from patients with typhoid fever and to give them as little as possible, and that little only in liquid form. The teachings of Hippocrates prevailed especially with regard to this terrible disease, and these patients would get only a little weak tea or barley water; even milk was kept away from them as it was considered a form of nourishment which might disturb them too much. So the starvation plan was carried out in this disease also, up to the time of convalescence.

The renowned clinician, Dr. Graves, of Great Britain, was the first one to try to introduce

some reform in the treatment and management of typhoid fever in regard to diet. He thought that the starvation method was not a good way to treat these patients and that perhaps a great many of them died from lack of nutrition—not so much from the fever as from the lack of nourishment—the body being unable to fight the disease. So he thought he would give these patients light nourishment, and he gave them milk, which is a liquid food that is easily digested. He was the first one to make use of milk in the dietary of typhoid fever in a considerable degree —to give them a good amount of milk. That theory was combated by the clinicians of that day; many thought that he killed his patients, and like all innovators he had a great many enemies. The profession was not ready to accept the great change of giving milk to patients with typhoid fever. Graves fought his battle, however, and finally carried it through. In the meantime, many physicians more and more adopted his plan. Dr. Graves was so proud of this reform of introducing milk into the diet of typhoid fever that in his will he left directions that his tomb should be inscribed: "He fed fevers."

That was the first article of food that was added to the dietary of typhoid fever patients for many years; they were kept on a diet consisting of milk, broths, and gruels. Then came another current from Russia. There are a few clinicians there who tried giving typhoid fever patients an ordinary diet, solid food—anything. I do not remember the name of the man[1] who first introduced this treatment, but at any rate some of the physicians took up the plan of treating these patients with the ordinary food—bread, meat, and vegetables—and still they reported results that were not worse than if the patients were treated with very fine food in their diet. They claimed that their patients thrived, felt stronger and better, and got over the disease just as well. Now, you will ask, what shall we do?

In my opinion, we should not give the patient the ordinary daily food. That would be too radical a change. But their experience has shown that we need not be too much afraid of introducing a little more food into the dietary of these patients, and that typhoid fever patients need not always be restricted to strictly liquid

[1] His name is Bushuyev.

food. We may give them a semi-solid diet, and perhaps in some cases may give a little solid food.

Now another point has emanated from this country. I think the beginning of this was in Germany, but it was not carried out to the extent to which it has been followed out in this country. A great many years ago, Prof. Leyden, of Berlin, who has done so much for the dietetic treatment of diseases, was of the opinion that with typhoid patients, or any patients with fever who lose so much flesh, we might by increasing the nourishment, be able to check the loss. It has been for quite a while a subject of controversy as to whether this could be done. In such fevers, the expenses of the body are increased and the intake is diminished, and it was a question as to whether the digestive system would be able to take up the food, which would balance or outbalance the loss. That question had not been decided until Dr. Warren Coleman of this city took it up and carried the point so far as to prove that you can give a typhoid fever patient enough nourishment to prevent him from losing flesh. Sometimes you can even make him gain during the febrile period. It is,

therefore, only a question of the quantity of nourishment introduced, whether he loses or not. Dr. Coleman of Bellevue Hospital really did a great deal of meritorious work in this line.

Some years ago I tried to nourish some of these patients in the German Hospital, (now Lenox Hill Hospital), giving them larger amounts of food. We gave them milk and added raw eggs—three or four a day, beaten up in the milk and strained. Dr. Coleman gives still more. He adds cream to the milk, increases the liquids and gives sugar of milk—that is, sugar that is not so sweet. It can be put in the milk or in lemonade and makes a very agreeable drink; and at the same time increases the amount of nourishment, as it contains a large amount of carbohydrate. If you give a tablespoonful of lactose you have sixty calories, and you can put two tablespoonfuls in a glass of lemonade or milk and thus furnish 120 calories. If you give eight ounces of milk with two tablespoonfuls of lactose, and give that eight times a day, you get a fair amount of fluid of nutritive value. Dr. Coleman also gives his patients eggs, farina, rice, and toast. He is not so careful in abstaining from solid food, and gives practically a liquid and semi-

solid diet. If milk is not well-borne, we have to give other things, barley, broths, and eggs, and so have a good variety.

Last fall I had a patient from out of town with typhoid fever. He had lost twenty pounds of flesh and had headaches, but no one had made a diagnosis of the condition. He came to me for a diagnosis, for everyone thought he had some stomach trouble. He complained of indigestion and his appetite was poor. He was kept in the hospital under observation for a day or two, and we found that he had some temperature, and then the diagnosis of typhoid fever was easy. His previous examinations had been made at a very early stage. In that beginning period before he had high fever, he had lost twenty pounds. When he came into the hospital he said that he could not stand milk, that it disagreed with him. So I started him on plenty of lemonade with milk sugar, and gave him eight or ten eggs a day beaten up with barley decoctions, and butter in addition. That man did not lose another pound during the entire course of his typhoid fever. As soon as the fever was over the nourishment was pushed further, and he gained right away, and we sent him home with

a gain of fifteen or twenty pounds. That was an example of what can be done with diet in typhoid fever for a patient who cannot stand milk. If he had been able to take that, it would have been still easier to give him nourishment.

In typhoid fever, too, on account of the length of its course, see that the patient takes food say every two hours. Give him lemonade, grapefruit, good chicken soup, a little ice cream—that is very refreshing and good. The same principle will apply to diseases of any duration accompanied with fever.

Now we will take up the diet in chronic affections not accompanied with fever. The principle which prevails here is just the reverse of that adapted for diseases of an acute type and short duration. In those we said that we need pay no attention to the amount of nourishment taken. It does not matter that the patient takes no food for a short time; he will get over the disease quickly. In diseases of a chronic nature the first principle is to see that the patient takes enough nourishment; for unless he gets sufficient nutrition it does not matter what else you may do —the diet may agree, the medicine, etc., be just right—but the patient will go down. He is

bound to lose. He grows weaker, and finally succumbs not so much to the disease as to subnutrition. No matter what type of disease patients have, they will get tired of the diet. If you do not pay a great deal of attention to them, and especially if the diet is restricted too much—say milk and eggs, and chicken soup, and nothing else—in a week or two they get tired of it, and do not enjoy it, and the tongue gets coated, and they take less, and grow weaker. So you have to see that you give the patients enough nourishment. This principle comes first in the plan of treatment, no matter what the disease is.

If you have to deal, for instance, with tuberculosis patients, who form a large class of these chronic sufferers—if you are not attentive in seeing that they take nourishment;—they will take less and less; they have a little fever off and on, and may have some catarrhal condition of the stomach or some catarrh of the bowels and not feel like eating. They are in a state of starvation, and very often they succumb to that. I will tell you of a case to show what can be done with proper nutrition in these cases. I was once called to a patient, a lady with lung trouble, who had suffered with diarrhea. Al-

most anything she took caused the bowels to move right away. The treatment she had been having consisted in keeping from her all kinds of food. She had only a little warm broth and perhaps two eggs in 24 hours. She had lost a great deal of flesh and looked like a skeleton, and had high fever, and the question was what could be done for her. When I got there I saw that she would die in no time, two or three weeks, perhaps, unless the plan of diet was changed. So I said we must give her nourishment, diarrhea or no diarrhea. We must put in food. It is better to put in and lose something, than not to put in at all. So we began to feed her. We gave her six or eight eggs a day, farina with milk, rice with milk; and in a few days we started in with meat and mashed potatoes, and we fed her five or six times a day. She had a nurse to watch her and push the feeding, and make her take the food; and by and by she began to rally, and in a short while she lost her temperature, and her bowels were better, and she began to go out, and gained thirty or forty pounds, and it was three or four years before the lung trouble again asserted itself and she died.

If there is subnutrition existing, you have to

step in and work against it. You may say that the bowels are weak and cannot stand anything. You must try. I do not mean to say that you should not give any remedies. That lady, besides the diet treatment, had some remedies to bridge over the symptoms. If there is diarrhea, we will give them some tannigen, bismuth, and a little codein, but they must eat at the same time.

It is very much the same in other chronic conditions—gout, chronic rheumatism, chronic Bright's disease—which is a very common complaint. Here the diet is often too one-sided. A great many physicians give milk and milk alone in kidney troubles because, as you know, the kidneys are not able to keep back albumin and make use of it; and the principle is to keep away the proteid foods as much as possible in order to save the organ. But if the diet is too one-sided, if the patient takes too little and does not enjoy it, he suffers from inanition, which is worse than the disease.

In these chronic diseases you can pay attention in the plan of treatment to the work of the affected organ, to its function, to see that the diet should not be too heavy for the particular

patient. In kidney trouble you will try to eliminate the protein to some extent; give only a little meat, but the principle should not be carried to the extreme; you must give in a little and adapt the diet in such a manner that there will be a variety in the food, and the patient will enjoy it. Give them all the cereals and bread and a little meat. Restrict the particular article that you do not want, but do not cut it out entirely. The same way with diabetes mellitus—or sugar disease. We know that sugar is not well-borne; the system cannot use it up, and eliminates it through the kidneys. So, as a rule, we put these patients on animal diet, and cut off starchy foods; but if you take these away entirely the patient gets tired of the animal food and grows weak and runs down. Most physicians to-day agree that it is well to give them a little starchy food; the system is better off with a mixed diet; but restrict the undesirable kind. Give them only two rolls a day.

A restricted diet can be carried out without harm for a short period of time. You may institute a milk diet for a week or two without harm, but to carry it on too far is always a mistake.

The system is apt to suffer from a one-sided diet, no matter what the disease is.

After these points on diet in chronic diseases, we will go on to the diet in diseases of the digestive tract. With these, on the whole, the same principles prevail as in the other diseases. Acute conditions require little attention to diet. The diet should consist of the finest foods in liquid form and in small quantities. We do not have to look out for large amounts to cover the loss, and we act on that principle.

Acute indigestion, for instance. Some one has taken too large a dinner, has fever, and vomits. What will you do with the patient? The best thing is to do as little as possible. Leave him alone. He has no appetite, and does not eat for a day or two. That is all right. There will be no bad consequences. In a day or two the bad condition will be over and he will begin to eat again. If, however, the patient is in a much reduced condition, and not well nourished, you will have to give some nourishment—clam broth, milk, tea and sugar. Give them light nourishment, and they will get better.

The same obtains in diseases of the bowels—

for instance, in severe diarrhea. Leave the patients alone. Give them a little tea, warm soup, until the acute attack has subsided, and then begin to nourish them again.

The chronic diseases of the digestive tract may be divided into two large groups—one in which there is organic disease present, like ulcer or cancer; and the other in which there are mild inflammatory conditions, catarrh, etc., or functional disturbances present.

In regard to organic disease, ulcer of the stomach, for instance, there we make a division between the two stages—the acute state of the ulcer where there are more pronounced symptoms, severe pain and vomiting; and the chronic stage, the period of acquiescence, where the condition is not so active. The treatment must be different in the two periods. In the acute stage, again rest is the principal thing. If the patient has a hemorrhage, keep him on rectal alimentation—practically starvation, and saline injections; some of the fluid is taken up by the system; perhaps one-third or a quarter of the nutritive material introduced through the bowel can be taken up, but it is essential that the digestive tract should rest for five or six days.

Then begin with mild liquid diet by mouth, or duodenal feeding. That represents a method of feeding which covers the losses and gives rest to the stomach.

But when the acute stage is over and the chronic form has begun, then you have to look out for a sufficient amount of food. The food should not, however, be too irritating to the system. In cancer of the stomach we have to look out that the patient is well nourished, and we give him fine articles of food, and if it is impossible to put the food in the stomach normally, as in cancer of the pylorus, a gastroenterostomy is done to make nourishment possible; but again we have to see that the food given does not irritate the particular disease. A patient with cancer cannot stand the ordinary food, but we have to give him as much of a light food as we can, and as long as we can.

In the second group of cases, the functional diseases of the stomach and intestines, it is very important to feed them properly. Formerly the principle prevailed that all dyspeptic individuals should be put on a diet, and by that was meant very little of the finest food—a milk diet, or soup, or perhaps a little meat. There was a

physician in the city who used to give his patients meat and broth, and perhaps a few slices of toast—nothing else; and that particular diet was carried out with a great many patients, sometimes with some benefit, but oftentimes with a great deal of harm. In Germany to-day that theory of dieting a patient still prevails, more so than I like. I often have such patients come to me, and I tell them to go ahead and eat like other people, only to exclude this or that; and by and by they come to me and ask if they should not be put on a diet,—meaning to be kept away from food. But in my opinion, that is the worst thing for them to do.

It is my conviction that the principle that prevailed in former years of putting every—patient with dyspeptic symptoms on a restricted diet—was a wrong one. A great many persons who suffer from minor ailments of the digestive system keep away from food. Many physicians think that starchy foods are harmful for such patients, and forbid them to take bread and potatoes. All vegetables contain starchy food, so they are allowed only a little bread and perhaps only a little meat, and they do not enjoy their food, and symptoms of inanition develop,

and many of these invalids ultimately die of improper feeding.

The proper principle is not to forbid anything but what is sure to cause harm. Everything else should be allowed. These patients should be given great liberty in their diet, because it is of the greatest importance to look out that these chronic dyspeptics get a sufficient amount of food. That is the principle upon which I act, and the more I practice it the more am I convinced that it is the right way of treating these patients.

One of my patients was a physician from Texas who had some dyspeptic troubles, and he got worse and worse, until he had lost forty pounds of flesh, and finally had to give up his practice on account of his inability to take food. He came to this city, where he had a good friend, a nerve specialist, who invited him to stay with him at his summer residence in Greenwich and offered to look after him; but the man continued to grow worse. He could not take any food, and still lost flesh, and having had to give up his business he was constantly worrying, and his nervous symptoms did not improve. Finally he came to me for advice, and began by telling

his story. He could not take any toast, for that caused symptoms right away; he could not take meat, for it made him vomit; he could not take that, for it gave him a headache, and so on—he could not take anything. He thought that I was going to be guided by his opinion, but he was mistaken; if I had done that, he would be dead now. I told him that if he wanted to be treated by me, he would have to do as I directed, and leave his own opinions alone. So we began. His disease as such did not amount to much. He had an atonically dilated stomach, and was in a run-down condition, but had no organic disease. We began to feed him, and I had to make him eat contrary to his own convictions. I had to give him bromides at first, to act as a sedative, but he did as I said, and began to eat, and he regained his flesh, and is now practicing as before, and is convinced that he can eat everything.

A great fear of food—"sitophobia"—develops in many of these dyspeptics, perhaps because of some disturbances they had experienced and because they have been told to keep away from all kinds of food, and when they do take it that fear gives them more symptoms, so that the

patient is worse if he has to eat something; he is afraid to sit at the table, and certainly he must suffer. That condition must be combated—the aversion to the sight of food and the fear of it. You must tell them that even if there is some pain, they must take the food and get out of that condition. It is better to eat and suffer than not to eat and not to suffer. You cannot live without food. That is the first and foremost principle.

LECTURE IV

THE DIET IN CHRONIC AFFECTIONS OF THE DIGESTIVE TRACT (CONTINUED)

To-day we will continue with the subject of diet in the treatment of diseases of the digestive organs, of a chronic nature. I mentioned in my last lecture that severe illness and organic affections have to be treated differently in regard to diet from those troubles which are more or less of a functional character, and which are in the majority.

We will subdivide this large class of functional disturbances, taking the stomach first, into three divisions:—one in which the gastric secretions are increased (hyperacidity); the second, in which gastric secretions are normal, and third, in which they are diminished (hypoacidity). In hyperacidity—too much acidity, too much gastric juice—we again have several subdivisions: One, continuous hypersecretion and the other, increased secretion during digestion, *i. e.*, digestive hypersecretion.

The second large group is that of rather normal secretion and the third, is diminished secretion, or absent secretion. We have to deal with all of these conditions. First, we will take the group in which the gastric secretion is increased, which in my experience forms more than half, or about half, of most functional diseases of the stomach. Up to within recent years, the diet question in the class of cases where the acid secretion is increased has been in a rather unsettled state. There are a great many physicians of repute who maintain that all starchy food should be forbidden to these patients, because it has been found that the symptoms in these cases are rather increased after the ingestion of starchy foods. The physicians who represent that idea have gone so far as to designate this class of cases as "starchy dyspepsia," or "amylaceous dyspepsia," indicating that they ascribe so much importance to this particular thing that they found it worthy to name it in this way —and have arranged the diet accordingly. According to these physicians, the diet for hyperchlorhydria consists in allowing meats and fats, taking away entirely the carbohydrates. The Salisbury régime, which I have mentioned

before—meat, broths, and little toast—is also representative of that idea—the starch-free diet.

Now while it is found that a patient with hyperchlorhydria when put upon, say, eggs, and a little meat and nothing else may be relieved of his symptoms—may lose his pain, belch less, and may be more comfortable—while all this is true at first, I do not think a real cure will take place if that diet is extended too long.

Now, again, there are a number of physicians who represent the opposite view. Pawlow, the St. Petersburg physiologist, has made many experiments on animals, with the stomach arranged so that it can be looked into and examined, and has found that meat and all nitrogenous foods have a tendency to increase the flow of gastric juice, while vegetables, the carbohydrates, and fats have a tendency to diminish gastric secretion. (In parenthesis I will mention that Bickel experimenting in a similar manner as Pawlow put up food groups distinguishing between weak and strong secretory stimulants, as follows:

1. Weak secretory stimulants.

Beverages: plain water; alkaline water without CO_2; tea; rich cacao; milk; cream.

Spices: sodium chloride in 0.9% solution.

Foods: dissolved or finely emulsified albuminates, as for instance fluid egg albumen, solutions and suspensions of lactalbumin, casein, glidin; pure carbohydrates, as sugar and starch; fresh wheaten bread; all kinds of fat; well boiled meat; ragouts of boiled meat with fatty, but unseasoned gravy (especially the fat and white, but not salted meats, as fresh fish, chicken, calf, pork); puréed or stewed sweet fruits, likewise vegetables prepared in the same way with butter, as for instance potato, rice, farina, sago, asparagus, red cabbage, cauliflower, spinach, white beets, carrots, cucumbers; soups prepared without meat extracts but boiled in plain water, like vegetable soups or bread soups or oatmeal gruel; dessert dishes prepared of beaten egg albumin, cream with rice, farina, mondamin, etc.

2. Strong secretory stimulants.

Beverages: All alcoholic and carbon dioxid containing beverages, as for instance wine, beer, the mineral and saline waters containing CO_2; coffee and caffein free coffee, all coffee substitutes, fat free cocoa, and skimmed milk.

Spices: sodium chloride, excepting the 0.9%

solution; mustard; cinnamon; cloves; pepper; paprica; all soup seasonings.

Foods: All broiled vegetables and animal foods; the yolk of the egg, coagulated egg albumen, raw, broiled or slightly boiled meat, especially raw and slightly broiled meat, principally the dark meats; all salty and smoked meats inclusive fish, prepared in the same manner; meat extracts and all dishes prepared with them, like bouillon, bread, especially brown bread and pumpernickel; toasted bread; all vegetables mentioned in rubrik 1, (if steamed and prepared in their own juices and not served as pureés.)—This led the way to a second arrangement of the food in cases of hyperchlorhydria. These physicians said that if we give these patients a diet rich in animal food, the gastric secretion is increased and the stomach is overstimulated. So they have started the opposite principle of feeding, and said that we should keep away all animal food from patients with hyperchlorhydria, and give them a strictly vegetable diet, with butter.

Both parties show successes in their treatment; both have their failures—which is quite natural, like everything else. Now, the question is,

what shall you do. If you read the books, one will forbid all starchy food to these persons; almost all vegetables too. The other will teach just the opposite for the same class of cases. My answer to this is that neither of them is altogether right; for, as I told you a week or two ago, any diet that is arranged for a long period of time must contain all the three groups of nourishment we need, proteins, carbohydrates, and fats. While we can arrange a diet, a bill of fare, in such a manner that one group should predominate and the others be lessened, we cannot exclude any one of these three cardinal nutritious groups from any diet. That is a cardinal point. We must give a patient all these three things; but where there is too much secretion a starchy food is not so well used up, and you can give that patient less starchy food, and more fat and albuminates. So, in actual practice, in these cases of hyperchlorhydria, I give them meat in a large amount and fats, and diminish the starchy food. I tell them that they should not eat too many potatoes, put no restriction on bread—for that is such an important article of food, and if some patients

do not eat bread they cannot eat anything—and give them all plenty of butter.

The reason why starch can be given to these patients is, first, that even if it does not change so quickly (the acid gastric secretion when reaching a certain height, checks the ptyalin action of the saliva, in the stomach), the pancreatic juice contains a very active ferment for the conversion of starch into sugar and ferments for the conversion of fats and albuminates; and if the starch digestion is inhibited in the stomach it will be finished further on in the digestive tract. Another reason is that if the acidity is so great as to prevent the change of starch into sugar, we can give these patients alkalies to diminish the acidity, and that is better than to take away the starch; it is better to give a remedy than to take away the food.

Liberal diet

So the diet in these cases of hyperchlorhydria should be a liberal one. We must take away all highly spiced substances, and not give them too much of the tougher meats, such as beef, pork, venison, but a liberal diet of chicken, lamb chops, or the tender meats, and plenty of milk, butter and eggs, bread and cereals, and

rather restrict potatoes and other starchy substances.

We will now consider those cases where there is continuous hypersecretion, the group in which the stomach continues to secrete juice even if there is no food present. Usually we find this condition in ulcers of the pylorus; rarely, in cases of neurotic disturbances, either due to organic nervous diseases, central lesions, or sometimes merely functional in character.

What will you do in this group? Here frequent eating is of great importance. Try to make use of the gastric juice which is given by the stomach anyway. It irritates the mucous membrane and makes the patient uncomfortable—but if you put in some food, and especially albuminates which have a tendency to enter into combination with the acid—the acidity in the stomach is diminished and that gives them relief. These patients tell you that they have pain three hours after eating. If they eat, the pain is better. The acidity is reduced by the ingestion of food. The water and the albuminates in the food bind the acid, so that it is not only diminished (diluted) but some is taken away (partly neutralized). Some of these

patients wake up early in the morning. The acidity is too great for the stomach. If they put in food—eat breakfast, they feel all right. So frequent eating is a cardinal point in the treatment of these cases.

Fats have a tendency to inhibit gastric secretion, and are to be recommended in all these classes of hyperchlorhydria, and continuous hypersecretion.

Now, we will take up the cases in which the gastric secretion is normal. The symptoms may be of a high character. The patient complains of all kinds of things—pain, eructations, loss of appetite, etc. This is the group designated as nervous dyspepsia. The symptoms are distressing, but still we find nothing radically wrong. We cannot find any deviation from the normal, and still the patient complains, and so we ascribe the condition to some nervous phenomena which we do not exactly understand. These cases have to be treated differently. They can eat anything, and should be made to eat everything; they should be given a liberal diet; no restrictions at all in these cases. Very often these patients with nervous dyspepsia eat lightly, and if kept away from food they

would never get well; but if you change their habits of eating, the change should not be made too abruptly. If patients have been on a strict diet for a long time, you cannot bring on a change in a day. A patient who has been living on milk and crackers for two years if put at the table and given a good meal—even if the stomach is good—will have trouble. The stomach is not used to it. You should take a few days, or even a week, and gradually change the diet, until the patient is put in such a condition that he eats everything. All of these cases of nervous dyspepsia should eat everything, but make the change to the regular way of living slowly.

Now, we come to the third group, in which just the reverse of the first group exists; the gastric secretion is diminished—and ultimately we will take the group in which there is no gastric juice at all.

In chronic gastric catarrh there is a diminution of the acidity, and in functional nervous disorders, disorders of a depressed character, the stomach works poorly and the acidity is diminished. In all these cases the vegetable foods should predominate, and not much meat should be given. Meat should be restricted,

and fats as such should not be given in large quantities, for they have a tendency to inhibit secretion. Meat, on the other hand, has a tendency to increase secretion, but if too much is given it creates a disturbance—so we give enough meat, and less fat.

Now, all these questions have been worked out by the physiologists, but we cannot take their findings right away into the clinic and say, "We go according to them." It is only if they have been proven to do good in practice that we can adopt them. Until then, we cannot go by them alone. In Germany especially, many clinicians act too much on these physiological experiments. They at once give a diet according to these rules. But that is not the best way. It is best to go by what we find to be of clinical value, and to leave the theories, as such, alone. If we find something practical, and this corresponds to a certain physiological theory, so much the better.

Now we come to the class of cases in which there is no gastric secretion, achylia gastrica. That is a large group. These patients have no organic disease, and yet have distressing symptoms. It is the result of something else. The

condition is easily managed and the dietetic treatment here plays a great part. The food is changed very little in the stomach in these cases, for there is no gastric juice. Not only the albuminates but also the starch and fats are unchanged. Starch as such would change in such a stomach, but the starch is usually enclosed in a membrane of plant albumin, and this little membrane or coating which surrounds the starch is usually opened by the gastric juice; but in cases of achylia there is no gastric juice, and the ptyalin cannot reach the starch and enter it; and that is the reason why starch cannot change in cases of achylia. If you want the starch changed, you must see that the particles of food are entirely broken up, pulverized almost; that has a tendency to open up the little cells in such a way as to reach the secretion.

Another reason why these patients should have their food prepared in a finely divided form is again the circumstance that there is nothing in the stomach to help the dissolution of these particles. Normally, the gastric juice dissolves the connective tissue surrounding the meat and prepares it for further digestion in the intestine. In a case of achylia gastrica the meat

which is swallowed remains unchanged until it reaches the duodenum.

The connective tissue surrounding the meat fibers does not disappear, and the latter reaches the duodenum in the same shape in which it was ingested. It looks as if it had been masticated and spit out. Some of you have seen me take out such stomach contents which look exactly as if the food had been chewed a little and then brought out. So the mechanical division of the food is important in these patients with achylia. If the food comes into the duodenum unchanged it creates symptoms—pain, etc., and the patients suffer from catarrh of the bowels, frequently causing constipation alternating with diarrhea. Not only in the stomach but also in the intestines the food continues to be an irritant.

So the foods in these cases should be finely divided mechanically. Accordingly we give these patients cereals in fine form, pea soup, lentil soup, mashed potatoes, raw and soft boiled eggs. If you give them hard boiled eggs, they will remain in the stomach, but raw eggs which are semi-liquid will slip through. We give these patients very little meat, for the reasons which I have already mentioned. I

have found very often that by such a strict diet of liquid and semi-solid food—they must be told to masticate their food well—that they can get along very well. The diet brings on a great improvement.

But shall we let these patients continue on such a diet indefinitely? No. The principle to which I have already referred is important not only in the other groups but here also—that a diet deviating much from the normal should not be kept up indefinitely. Our tendency should be to strengthen the digestive tract and harden it, and bring it to such a state that it can manage normal food. No matter whether the constitutional condition is changed or not—we may not be able to remove it, but if we can change the patient's manner of living so that he can live like other people,—we have attained what we want. We want to take the patient away from invalidism, and from anything that tends to keep him in that condition.

Here too, in achylia gastrica, while at first we are strict in having these patients live on fine foods, step by step we introduce other things, and arrange so that in time they can digest ordinary diet. It takes time—a month, per-

haps two or three months,—but that should be the aim. I usually find that these patients with achylia can live twenty, thirty, or forty years and even become normal individuals. If you can bring them to a state where they can enjoy a normal meal, they are practically well. The intestine is strengthened in such a way that it learns to do the work which the stomach ought to do. That can be done by a gradual change of diet, increasing it step by step. This principle must extend to all chronic conditions.

Another point of great importance. Many of these dyspeptic individuals—no matter what the character of their digestive disease—have been forbidden a great deal, and have lived with so little nourishment that they are in a condition of subnutrition. They are run down, and cannot do anything; they lead lives of invalidism, lie on a lounge, etc., and many of them gradually die of starvation. The nerves are not nourished; all the organism is in a state of inanition, like a business in which there is too little money. Such a business cannot go on well. So with the organism. If the body has not enough food, it takes a little of its own fat and muscle, and that will not do. That is what these patients really

represent. They are dizzy and have no appetite, and are weak—all symptoms of inanition. If we treat these patients by giving them a diet on which they have just enough to lead their existence, they will never get well, for they remain in that weakened condition. But if we can feed them up—increase their diet, give them more food than they need, build them up—we can get them well. The question in all these cases is—can you do it? My answer would be that in nine cases out of ten, or perhaps still more, you can do it, provided there is no organic lesion present—no cancer, no obstruction; simply a lack of nutrition, some functional disturbance. From my experience, I would say that in more than nine cases out of ten you can succeed in changing such an individual and building him up.

The question is: How to do it? I answer: First change the diet, and change it gradually, as I said before. You cannot do it in a day. The intention is to have the diet similar to what the patient has been having, only we make it more nutritious gradually. Suppose you have succeeded in changing it and the patient now takes three meals a day, and you want him to gain

flesh. This applies not only to diseased individuals, but to any one. We have a number of thin persons here, some of whom might like to gain a little flesh. Some one may want to gain, but he says, "my family is thin, we are all thin; I cannot do anything." That is what people usually say: "We are all thin; that is the way we grew up."

But such people can be made stouter. We can make them gain if they carry out what is needed. Such a person takes for breakfast, say a cup of coffee, an egg, and a roll. If we want him to gain, we must try to make this bill of fare more nutritive. Instead of coffee, we say, take two parts of milk and one part of coffee; then he has more milk. Then we tell him to take a great deal of butter on his bread, and to take two eggs instead of one, and butter with them. Then for lunch, do the same way. Make the foods which he has been taking more nutritious, take more cream, more sugar. If the patient has been just maintaining his weight all the time on his former diet, make the drinks more nutritious. In a week or two he will report that he has gained a pound; if he keeps it up, he will gain more—if he keeps up the same

amount of work. Now he begins to take more milk and more butter. What he does not need to maintain his balance goes to make more flesh. If you want some one to gain and he has been walking three miles a day, and it is essential that he should gain weight, have him take between meals a glassful of milk and bread and butter. At first he will tell you that his appetite is not so good for the next meal, but he will soon get used to it. That is practically the way I proceed with these patients where it is necessary to build them up. Have them take their regular meals and add two small meals in between. I lay much stress on the amount of butter. Tell them to eat a quarter of a pound of butter a day. A quarter of a pound of butter contains almost a thousand heat units. If he eats a quarter of a pound of butter a day, he has a thousand heat units added, which he does not need for living, and it goes into fat. Butter is easily taken up—you can put it in oatmeal, eggs, on bread, etc. The patient enjoys it, and eats more. So butter is a very important article of food, in those cases, where it is essential to increase the body weight, and it is essential in many instances.

If a man is all right, leads an active life, that

is all right. But if he is very thin, barely covers his expenses, if he gets sick he has not much to draw upon, so it is well to have a reserve fund of flesh to draw upon.

The same principle can be turned around. Normally, we should be just right—not too stout, not too thin. There should be harmony and symmetry in our organism, and if a person looks just right, you can judge by the appearance that he is all right. But if you grow clumsy and can hardly move about, that is not well. Can you reduce the weight of such persons by diet? Yes. But there again is a point of great importance, that is, exercise. If you have a stout fellow taking food that just keeps him in his balance—he does not gain and he does not lose, and you want him to lose and still you do not want him to reduce his bill of fare too much, for if you make him take too little he may have some heart complications—increase his exercise. If he is used to walking two miles a day, make him walk three or four, and then five, or make him climb a mountain, and with the same food he begins to lose gradually. That is the best way of reducing flesh; but if you see that he is eating too much, eats enough for three people, then

reduce his food. Instead of taking milk, give him coffee and tea for breakfast, and take away the butter; and if he eats between meals, tell him to have three meals instead of five. Treat him the opposite way from the management of increasing weight and you can succeed in reducing flesh.

People can increase or diminish bodily weight at will, provided these instructions are carried out. It is far more difficult, however, to make a stout man thin than to make a thin man stout, because what you want is not to the fancy of the corpulent man, though it is all right for the thin man, for he soon learns to enjoy his food. But the stout man does not want to give up his butter, and keeps on eating a little more than he needs. Otherwise it would be as easy to reduce as to fatten an individual. You can succeed even here in nine cases out of ten, provided all the instructions are rigidly carried out.

LECTURE V

THE CARE OF DIGESTION[1]

Digestion deals with the processes of food ingestion, assimilation, and ultimate waste elimination. Health and life are dependent upon the harmonious working of the digestive apparatus. Its disturbed function creates disease; its interruption for a longer time carries death with it.

It appears worth while to consider here some of the points which serve to keep the digestion in good shape, in order thereby to preserve health.

For this purpose we may divide our subject matter into the following items: (1) Food intake: quantity required in growth, manhood, old age; (2) State of the body for this act; (3) Period of assimilation; (4) The final act of waste elimination (defecation).

The quantity of food required is very definite

[1] An address delivered before the employees of New York City, October 11, 1916, at the Municipal Building, New York. Medical Record, Nov. 18, 1916.

and is greater in the period of development and manhood than in middle age or old age. During the time of growth a large quantity of the nourishment is utilized for the upbuilding of the body. In manhood the greatest activity is manifested, and this again requires additional nutritive material. In middle and advanced age the activities are gradually reduced and the food requirements are accordingly lessened. With the beginning of middle age there is often a tendency to corpulence; for occasionally at this period with the reduction of work there is no decrease in the quantity of food intake. The surplus of nutritive material is then stored up in the body in the form of fat.

The diet should be watched and arranged somewhat differently for these different periods of life.

In most instances in health our instinct guides us correctly and the appetite is a sufficient monitor to go by. Transgressions may, however, occur in both directions by faulty habits (overeating on the one hand and too scanty nutrition on the other). Thus opulence and high living give rise to an overabundance of the food intake, while poverty and avarice in the

parent's house or in the boarding establishment may lead to subnutrition. Both hypernutrition and subnutrition practised for a longer time may become established as a habit, *i.e.* the appetite here becomes deranged and is no more a fit guide for the best purposes of the organism.

In order to look for good health we must guard against either of these faults.

How shall we know whether we eat just right? The quantity of food physiologically required is known, and for the physician it is a simple matter to make a computation and to state whether somebody eats enough, too much, or too little.

The layman, however, can likewise easily find the right measure. First, his appetite may be used as a guide; second, everybody should eat about as much and as often as his neighbors and associates; third, everybody can see whether his body and strength are in good condition. If everything is harmonious and goes on smoothly, this alone is sufficient. If not the scale may be utilized and weighing yourself once a week or so will soon show whether there be too much or too little food taken.

What kinds of foods should be taken? Here,

again, the answer is: look at your neighbors, do the same, and you will not go wrong.

The following rules may, however, be given in a general way. Arrange for a great variety of food, which should embrace most nutritive substances easily digestible and also difficult of digestion. To select a diet in health consisting merely of easily assimilable foods would be a great mistake as it would serve to decrease the efficiency of our digestive apparatus.

Eating being one of the most important functions of the organism should not be done haphazard, but performed with care. A moderate amount of work preceding the meal increases the appetite and enhances the digestive function.

A few more rules regarding diet in health may here be added. There is a tendency in this country toward eating too much meat, which often leads to constitutional disturbances. Some people here take meat regularly at each meal. As a rule meat should be partaken of once or twice daily in quantities of about one-quarter of a pound for an adult, but not much above this. Plenty of vegetables should be served with it. Bread and butter, fruits, and salads should be used liberally. Water should be

taken with each meal, and if thirst be present also in between. Its importance cannot be too much appreciated.

Water itself is one of the principal ingredients of the organism. It contains, besides, in small quantities, mineral salts of different kinds which are utilized in the body economy. Food digestion, assimilation, and elimination require for these processes water as an intermediary, without which life is impossible. Fresh cool spring water at meal time increases the appetite and augments the pleasure of eating.

Too great fatigue destroys the appetite and banishes the joy of eating. The latter is then done mechanically, almost with disgust, and the process of digestion is thus disturbed right from the start. During meal time rest of the mind and body is essential. A comfortable seat, a nicely set table, pleasant company, wholesome food and drink (fresh spring water) are important factors in increasing the worth of the meal. General conversation not requiring much concentration of mind is rather useful. Direct business talk should be avoided. The meal should be ingested leisurely and time given to the enjoyment of the different courses (food

articles). The eating should be performed neither too quickly nor too slowly. Both deviations lead to manifold digestive disturbances. A short period of rest following the meal is advantageous. A mild cigar and pleasant conversation contribute toward the enjoyment of this after-table act.

The real act of digestion begins after the ingestion of food. The alimentary canal may be likened to a factory in which all the material brought in is sorted and changed in such a manner that it can enter the circulation and by means of that stream of communication reach all the body tissues.

ASSIMILATION OF FOOD

Unfit substances or the remnants of food which cannot be utilized any more are carried along the digestive canal to be eliminated at the end. The tissues of the body likewise throw off dead or waste material. They accomplish this through the eliminative systems (lungs, kidneys, skin, and alimentary tract, including the liver) reached by all the tissues through the blood stream. The digestive canal is thus one of the principal avenues for the traffic also of waste products of the body itself.

The assimilation is greatly favored by keeping the body in good trim. For this the organism must be in a state of contentment, which can be reached by satisfactory mental and bodily work. Every occupation should be performed with a good will and pleasure, and should not be carried on to over-fatigue and annoyance. Thus assimilation will be helped and good health made possible. Plenty of fresh air and a certain amount of muscular exercise(walking, horseback riding, rowing, gymnastics) are of importance. In the same way after the working hours rest and a sufficient amount of sleep (eight hours daily) are essential for good digestion and perfect health. Both exercise and rest, properly apportioned, enhance assimilation as well as elimination.

The final act of digestion consists in the expulsion of all the remaining unutilizable food substances and some waste products from the alimentary tract (defecation). This usually occurs once daily in normal individuals. Regular attendance to this natural event is likewise important for the well-being of the organism. With regard to this act the call of nature should be obeyed at the right time. Frequent neglect to perform this duty as well as too much devo-

tion to it lead to irregularities of the bowel and ultimately to ill health. In health the best principle is to let things take their natural course. Too much interference with it often leads to abnormal conditions and disease.

To sum up, the care of good digestion embraces the following items: simple life, in which work and rest for mind and body are harmoniously divided; regularity of meals, frugality, great diversity of wholesome foods taken, in just the right proportion; an abundance of water; proper attention to the call of nature. Good digestion is also the best promoter of good health and a long life. There is no elixir of youth for old age, or a rejuvenation remedy. In keeping our organism, however, in good trim, in looking out for its steady and harmonious activity, we succeed in delaying and perhaps also shortening the advancing state of invalidism and the dissolution period, with death at its end.

Life is not complete without death. The latter is a natural event at some time for each living being and its advent should not be begrudged.

LECTURE VI

THE CARE OF DIGESTION FOR THE SOLDIER[1]

Digestion deals with the food intake and its complete assimilation. The aim of the soldier is efficiency and a capacity for strenuous work, without injury to the system. In order to accomplish this, greater amounts of food than normal must be taken. The demands made on the soldier's digestion will be correspondingly greater.

The usual principles for the care of digestion can be briefly summarized as follows: Regularity in taking meals, eating leisurely, diversity of foods, frugality, work and rest proportionately divided. Neither overfatigue nor too much leisure should be allowed to occur.

Although these maxims pertain to all individuals alike, the soldier included, and should be followed, whenever feasible, the army-man is so placed that he frequently cannot obey these laws.

For this reason it appears appropriate to

[1] Written during my service period at Camp Upton. Medica Record, February 9th, 1918.

consider how best to act in these precarious conditions of a soldier's life.

1. **The Food Problem.**—A greater diversity of foods is usually impossible in camp life. The soldier will therefore do well to partake of every article of food offered him in order to avoid a diet that would be too one-sided.

As a rule he should endeavor to partake of the entire portion of cereals, vegetables and fruits allotted to him and of meat as much as he desires. Peas, beans and lentils contain a considerable quantity of protein and should be indulged in liberally. Fruit-jellies and jams are useful when fresh fruit cannot be had. The foods usually being concentrated, it is important to have tea, coffee, or cocoa, with milk and sugar at each meal, also good drinking water. The latter should be taken, one to two glassfuls (according to the requirements of the body; more in hot weather than in cold) at each meal.

2. **Rules for Meals.** —(*a*) When activity is known; (*b*) For exceptional and undeterminable work.

(*a*) The soldier should lead as regular a life as is compatible with his duties. Meals should be taken at regular intervals, if possible, at about

the same time every day. Some time should be spent in consuming a meal, eating leisurely, neither too fast nor too slowly. The morning meal should be the lightest of the three meals. A short period of rest (spent in conversation, smoking, etc.) after meals is advisable. After the evening meal, this period of leisure should be extended over a longer time. Anything that contributes to the amusement of the individual will be of help toward a healthy digestion. Playing of games or listening to music and story telling, is therefore, highly commendable.

(*b*) When there is a hurry call and the meal-time must be considerably shortened, the soldier will do well to partake of a rather small quantity of light foods. A cup of warm (not hot) coffee or tea and bread and butter or a sandwich, or porridge will best serve the purpose. Hot dishes and meats are not appropriate at such hurried occasions. The reason why larger meals and heavy foods are here not desirable is because the soldier then has no time, nor the desire to masticate the food properly. A heavy meal faultily ingested may easily lead to bad consequences.

Similarly, a meal which must be taken after exhausting marches or other overstrenuous work

or after prolonged fasting, should be of a light character and of a rather moderate quantity. After a period of rest, the next meal may be taken in full amount and in the usual manner.

3. **Urination.**—Passing of urine should be done at regular intervals, if feasible. Empty the bladder when arising and retiring, also before starting out for a prolonged march or other important steady work.

4. **Defecation.**—Attempt to have a movement of the bowels when arising. If unsuccessful, do not worry about it, nor think of it. Whenever there is an inclination for defecation, nature's call should be obeyed; otherwise, wait until the next morning. Drinking of water, ingesting larger amounts of fruits, salads, jams and vegetables will greatly contribute toward a regularity of the bowel movement.

5. **Rest.**—The soldier being subjected to strenuous work must also have periods of rest. This applies here in a still higher degree than in ordinary life. Efficiency is impossible unless there is complete recreation after fatigue.

6. **Sleep.**—Sleep is the acme of rest. In this state the muscles, nerves and brain cells are completely relaxed, and the blood stream washes

out and carries away all waste products which had accumulated during the period of work. Eight hours' sleep should be allotted, unless in exceptional straits, when this period may be somewhat shortened.

Rest and sleep are essential factors in keeping the digestion in good trim. For this reason as much attention should be paid to these two factors as to the other items regarding nutrition.

At first glance it appears rather impossible for a soldier to take good care of his digestive apparatus. For many of the conditions prevailing in army-life are necessarily contrary to hygiene. In reality, however, the soldier quickly accommodates himself to the new conditions, and his digestion is as good as in civil life. It is a great blessing of nature to have fitted our organism with a great deal of elasticity, so that it can adapt itself to the most unfavorable states.

In observing the rules outlined, good digestion will be considerably enhanced in the soldier.

LECTURE VII

THE DIETETIC TREATMENT OF CHRONIC DIARRHEAS[1]

I have selected the dietetic treatment of chronic diarrhea because this subject of diet is an important one in all diseases, and particularly so in affections of the digestive tract, as there we have to deal with an apparatus which is arranged to sustain the organism.

In order to discuss this subject of dietetic management of chronic diarrhea, it would be well to divide its forms into different classes. 1, Diarrhea due to chronic intestinal obstruction; 2, nervous diarrhea; and 3, chronic diarrhea, due to catarrh of the small intestine principally, sometimes also accompanied by a catarrhal condition of the colon. Most forms of chronic diarrhea mainly involve the small intestine; and this group can again be subdivided into 1, primary catarrh; 2, catarrh depending upon abnormalities of gastric secretion; and 3, catarrh accompanying ulceration.

[1] New York Med. Journal, Feb. 10, 1906.

In the treatment of all these types of diarrhea it is primarily important that we should make use of those foods which are nonirritating and which leave little residue. They must not irritate the bowel mechanically or chemically, nor must they be very cold when ingested.

The special treatment of each class will call for a variation in the dietetic regime. In chronic intestinal obstruction, so long as the patient is not operated on and the obstruction exists, the first principle will be that the diet should be a liquid one. This liquid diet will have to be maintained because solid food will not pass through the narrowed canal. It will be vomited and will aggravate the symptoms. We may give milk, raw eggs, and different kinds of broths and meat juices, but this will be all which we may allow. Variations to improve the taste, and bring more variety into the menu may be introduced, but in the main the foods will remain the same.

A reverse course must be adopted in that form of diarrhea which is of nervous origin. In this disorder, as far as we know, there is really no anatomical lesion to be found. It is simply a functional disease, and the chief feature of this

type of diarrhea is that nervous phenomena accompany it and also bring it on. This means that in addition to a diarrhea the patient also manifests other nervous symptoms. He perhaps cannot sleep well, his appetite is capricious, and then the diarrhea itself also manifests a character which shows its nervous origin. The patient will have a movement of the bowels principally after meals, or when he will have to meet a very important engagement; a professor before giving a lecture will have to excuse himself and leave the room, indicating that the state of mind has something to do with the movement of the bowels.

In these cases the whole management should be different from those which are due to anatomical lesions in the intestines. The diet, too, must therefore be arranged accordingly. It will not have to be such a rigorous one. We will have to make the patient eat almost everything. Even those foods which leave a residue do not play much part. I remember I had to treat a physician in this city who had this kind of a diarrhea. He had to excuse himself after finishing each meal. The main treatment is that the patient should try and suppress these move-

ments, *i. e.*, not to run to the toilet as often as he feels inclined, and besides other means, nerve sedatives. The diet should not be restricted; food of a laxative nature, however, should be avoided; otherwise these patients can eat everything.

Now we come to that class of diarrhea which is due to disturbances of the stomach. This is a group which has been recognized only in the last twenty years. We have learned to know that there are forms of diarrhea in which the small and large intestines are not very much involved, but in which we find abnormal conditions in the stomach itself, and if we try to arrange a treatment suitable to the derangement of the stomach, the diarrhea as such can be disregarded and still will be cured.

There are two lesions in the stomach, functional disturbances, which form the greater part of this class of diarrheas. One is the form which is called achylia gastrica, in which there is no gastric juice whereby the stomach does not digest albuminoid foods. Here the food enters the intestine practically unchanged, and thus irritates the bowel, causing the diarrhea, at least in some cases. Achylia gastrica is not always

accompanied by diarrhea. I think, on the contrary, that more than one half of the cases are accompanied with extreme constipation, but about one third of these cases of achylia gastrica are troubled with obstinate diarrhea, and this diarrhea is probably due to mechanical irritation within the small intestine.

Diarrhea may also be brought on by just the reverse condition, *i. e.*, one in which there is too much secretion and too much acidity in the stomach. Here it is not the mechanical irritation but most likely the acid itself which exerts an irritating stimulus on the intestinal mucosa, which leads to the diarrhea. This class, however, is a small one. Most patients who suffer from hyperchlorhydria are afflicted with constipation, and only a small fraction suffer from diarrhea, but we must remember that such a group exists, as sometimes they may be cured by alkalies.

In these two groups, in which the diarrhea is dependent upon a gastric anomaly, the entire treatment, medicinal and dietetic, will have to be arranged to suit the stomach. In the patients with achylia gastrica we find it expedient empirically, not merely theoretically, to exclude proteids from the diet. Such patients

do much better on a diet which contains little meat or no meat at all. They should live on a vegetarian diet. A vegetable diet is inclined, as a rule, to predispose to diarrhea, but in this group of cases it is just the remedy. If one keeps a patient on gruels and perhaps on nicely divided articles of food, milk, kumyss, later on bread and butter and omits meat entirely for a time, one will find that in a few weeks he will not suffer so much from the diarrhea. I think this to be the experience of almost all the physicians who handle these cases. According to my experience, however, it is not necessary to institute a rigorous diet nor to avoid meats altogether for a very long period. If we give the patient finely divided foods for a few weeks, at first liquid, then semi-liquid foods, we can then after a time begin to allow foods a little coarser, bread, vermicelli, barley, rice, and later on meat. We will find that the bowels will gradually get accustomed to these foods, even if the latter do not get into the intestine in so finely divided a state. These patients should masticate their food carefully. This is more important here than in any other class of stomach derangements. These patients do well on starchy foods.

Diarrhea, if due to a condition of hyperchlorhydria, will have to be managed quite differently. Here meats, a richly albuminous diet, will play an important part. These patients will do well on plenty of meat and eggs, and very little starchy food—just the opposite of those suffering from achylia—and also an alkali.

In the first group, achylia gastrica, it is not essential to administer hydrochloric acid, but in the second group, hyperchlorhydria, we will have to give alkalies.

We shall proceed now to the larger group of chronic diarrhea, due to abnormal conditions in the small intestine. This is the more difficult group to handle outside of the group due to intestinal obstruction (which we can only cure by an operation; otherwise we have to keep to liquid diet). This group, in which there is a chronic catarrh of the small intestine, comprises perhaps more than half the cases suffering from diarrhea. Here diet plays a very important part, and we will have to discuss a little more minutely how to handle them and what we should do.

There is no unanimity of opinion among physicians nowadays as to the kind of diet to

be given to such patients. Some say that these patients will do well on an exclusive meat diet; others again will say that patients get well on a strict milk diet. Others again say that milk is the worst thing. Among the latter is Professor Rosenheim, who recently wrote an article on this group of diarrheas. He says that he always failed with milk in such cases, because the milk sugar easily breaks down into lactic acid, which upsets the patient. He therefore excludes milk from the diet of these patients. He even goes so far as saying that the admixture of milk to cacao or to soup, and a little cream will also upset the patient.

So far as I am concerned I must say that I am not so much afraid of milk and I am rather of the opinion that while we should exclude all fruits, salads, highly spiced dishes, all irritating substances and cold beverages (all things which have a tendency to increase peristalsis should be carefully avoided), we should still try to give a sufficient quantity of nourishment to these patients even if their actual condition of diarrhea should apparently grow worse through the diet. I am of the opinion that if we are timid and give these patients very little food, they will, not-

withstanding the improvement of their diarrhea, perhaps having only two or three movements a day, soon suffer in their nutrition and the body weight will decrease. The great danger is that if such a condition of subnutrition is kept up, after a while we cannot cure such patients at all. This is the case with a great many of these patients.

In reality it is advisable to give rest to an organ which is diseased and it will then recuperate and do well later on and do more work. You may, in severe cases of diarrhea, try such treatment. We may give the patient very little nourishment, perhaps egg albumen water, but if so one should always bear in mind not to restrict the patient to this diet for more than a week or ten days. After this period we must reëstablish the amount of nourishment, and put the patient on a regime which will build him up. It is important to consider that even though the patient feels improved and the chronic diarrhea gets better on the restricted diet, he may be getting too little nutrition and a state of inanition results. The organs are weakened and the disease instead of growing better becomes aggravated. In this weakened state

the organism is not able to recuperate. For this reason I say that in these cases of chronic diarrheas, after having tried a very short period of time with little nutrition or no nutrition at all, we must give them plenty of food, plenty of eggs—eggs are indeed very good in these cases —six or eight eggs a day I generally give. We give them plenty of gruels and barley. You may try decoctions of barley, oatmeal and rice, and later on give them porridges, and then bread and butter, and then meats. I do not exclude meats. I do not give them any fruits, salads or any cold drinks or anything of an irritating nature. Nourish them well.

What will you do if the diarrhea is kept up? How will you manage that? Here certainly we must take recourse to some medicinal treatment. We may give them a tannic acid preparation, tannin-agar; we may administer an opiate. It is much better to make the patients eat and keep them on some remedy, so that they are able to keep up with feeding and check the diarrhea a little, than not to allow them to eat and not to take medicine.

I have found by experience that a great many patients soon begin to gain in weight, in fact in

most of these cases you can achieve a gain in weight if you give them sufficient nourishment, more than enough to keep the body in balance. They will add flesh too, and as soon as they are stronger they are able to fight the disease and do not require so much medicine. I have seen such cases. I particularly remember a patient who lost fifty to sixty pounds from chronic diarrhea. She did not eat anything that was forbidden her, and she thought that milk increased the diarrhea, also bread, and she did not wish to eat. Ultimately she took nothing. Her condition was so bad that she was almost a skeleton, but after I allowed her to eat and gave her in addition some slight remedy, after a few weeks she picked up and in two or three months recovered.

It is thus with a great many other patients, and I think it is very essential to bear in mind how important a part nutrition plays in prolonging life and curing disease.

LECTURE VIII

THE DIETETIC TREATMENT OF DIABETES MELLITUS[1]

In no disease does diet form a more important part of the treatment than in diabetes mellitus. As is well known, the nature of the disease consists in the fact that the organism is unable either entirely or nearly so to utilize the carbohydrate foods. We thus have to deal with a genuine anomaly of metabolism, and the main points of treatment will consist of a rational and appropriate diet so long as there is no specific remedy for this disease.

As it is possible to live on meat and fat alone without carbohydrates, it was natural to exclude this latter group of food-stuff from the diabetic diet. This was, indeed, done by the earliest observers who had knowledge of the nature of diabetes (Rollo, 1796), and this diet was adhered

[1] Remark: This lecture is left as delivered in 1906. It is applicable even now especially in cases not suitable for the Allen treatment. The only restriction will apply to the amount of fats given.

[1] Journal American Medical Association, Dec. 29, 1906.

to with slight modifications until the present time.

The following disadvantages are attached to a purely animal diet: It offers too little variety and departs too much from the usual mode of life, and in this way will soon pall on the appetite. At the same time it is poor in inorganic salts, thus predisposing to a surcharge of the organism with acids (acidosis) and subsequent comatose conditions.

An absolute meat and fat diet can be borne for only a short period. Such a diet would be about as follows:

STRICT DIET

8 A. M.: Two eggs, butter, tea; 11 A. M.: Ham, wine; 1 P. M.: Beef tea, 200 grams of meat or fish, one egg, lettuce or spinach; 4 P. M.: Coffee, two eggs and butter; 7 P.M.: Three eggs fried in lard, or fish with eggs or cold roast.

A trace of sugar is contained even in this diet, but it hardly amounts to over 1 per cent. By the addition of some milk and cream this diet may be made a little more agreeable, although the quantity of sugar is greater.

Such a diet list may be put together about as follows:

INTERMEDIATE DIET

Breakfast: 200 grams of milk with 50 grams of cream, two eggs, butter and 100 grams of roast.

Dinner: 200 grams of meat or fish with asparagus or peas, salads.

4 P. M.: 200 grams of milk with 50 grams of cream.

Supper: Four scrambled eggs with 120 grams of ham.

C. von Noorden[1] determines first how much carbohydrate a patient can assimilate and allows about half of this. Such a procedure appears very rational, but can be conducted only in special clinics and not in general practice. It is best to arrange the diet according to customary principles, varying it slightly to fit the individual requirements of the patient. Whether or not a diet agrees with the patient can best be determined by noting the diminution of the quantity of sugar, as well as the total daily quantity of urine, and secondly and mainly by the patient feeling better and stronger.

According to the experience of most clinicians, it is best to permit diabetics a certain, although limited amount of carbohydrates.

Seegen's[2] diet list for diabetics is probably

[1] C. von Noorden: "Ueber Hafercuren bei schwerem Diabetes mellitus," Berl. klin. Wochschr., 1903, No. 36, p. 817.

[2] J. Seegen: "Der Diabetes mellitus," Berlin, 1895; see also Friedenwald and Ruhräh: "Diet in Health and Disease," 1905, pp. 470–471.

the best known and, therefore, I will quote it in full:

SOLIDS

Allowed in Any Quantity.—Meat of every kind, smoked meat, ham, tongue, fish of every kind, oysters, mussels, crabs, lobsters, meat jellies, aspic, eggs, caviar, cream, butter, cheese and bacon. Of vegetables: Spinach, lettuce, endive, Brussels sprouts, pickles, fresh asparagus, watercress, sorrell, artichokes, mushrooms, nuts.

Allowed in Moderate Quantity.—Cauliflower, carrots, turnips, cabbage, green beans, berries, such as strawberries, raspberries, currants, also oranges and almonds.

Forbidden Absolutely.—All foods made from flour or meal; bread is allowed in moderate quantities, according to the physician's orders; sweet potatoes, rice, tapioca, arrowroot, sago, grits, vegetables, green peas, cabbage, sweet fruits, especially grapes, cherries, peaches, apricots, plums and dried fruit of every sort.

BEVERAGES

Allowed in Any Quantity.—Water, soda water, tea and coffee. Of wines: Bordeaux, Rhine wine, Moselle, Austrian and Hungarian table wines—in a word, all wines that are not sweet and that do not contain more than the average amount of alcohol.

Allowed in Moderate Quantity.—Milk, bitter beer, unsweetened almond milk, lemonade without sugar.

Forbidden.—Champagne, sweet beer, cider, fruit wine, sweet lemonade, liqueurs, fruit juices, water ices, sorbets, cocoa and chocolate.

In general, I use about the same diet as Seegen and give the following:

		Calories
Breakfast:	Three eggs	240
	Half a roll (20 grams)	50
	Butter (30 grams)	251
	Coffee (150 grams), milk (100 grams), cream (50 grams)	203
Dinner:	A plate of soup (200 grams), with egg	85
	Meat (200 grams)	200
	Half a roll and butter (15 grams)	175
	Asparagus with butter sauce (salad)	30
Supper:	Oysters or fish (100 grams)	100
	Three scrambled eggs with butter (15 grams)	365
	Half a roll with butter (15 grams)	175
	Westphalian ham (50 grams)	200
	Apples, tea and cream (50 grams)	138
		2,212

Various diet cures have proved of value in diabetes. Of these the best known are the "milk cure" of Winternitz,[1] the "potato cure" of Mossé, and the "oatmeal cure" of von Noorden.[2]

[1] Winternitz und Strasser: "Strenge Milchkuren bei Diabetes mellitus," Centbl. f. innere Med., 1899, No. 45.

[2] C. von Noorden: "Ueber Hafercuren bei schwerem Diabetes mellitus," Berl. klin. Wochschr., 1903, No. 36, p. 817.

Whereas Mossé's potato cure has not proved of much value, the other two cures are useful in suitable cases. They should not be extended over too long a time because a too limited diet is harmful if continued too long. Winternitz's milk cure consists in the patient taking milk exclusively (about four quarts daily).

Von Noorden recommends his oatmeal cure, especially in grave cases of diabetes. He uses either Knorr's oatmeal or Hohenlohe's oatmeal flakes. This substance is boiled in water for a long time with a little salt; while boiling butter and a vegetable albuminoid or, after cooling, the beaten white of eggs are added. Roborant may be employed for this purpose with good advantage. The daily quantity is 250 grams of oatmeal, 100 grams of albumin and 300 grams of butter. The soup prepared in this manner is given every two hours. Cognac or wine or black coffee may also be permitted.

No matter what form of diet is instituted, it is always essential to see that the quantity of food is sufficient. In this respect fat (butter, cream, oil, lard) is of more importance here than in other conditions. Alcohol, taken moderately in the shape of whisky, cognac or wine, is also

of value. The body receives in the first place more fuel (as 50 grams of alcohol, which may be put down as the daily quantity, contain about 350 calories), and secondly because the patient, with the addition of wine, can take more of the greasy food than without it.

STOMACH COMPLICATIONS

After thus having touched on the fundamental principles of diet in diabetes mellitus, I would like to add a few words about it in those cases of diabetes which are complicated with affections of the stomach. Two groups of functional disturbances of the stomach are found most frequently in diabetes, hyperchlorhydria and achylia.

If hyperchlorhydria complicates diabetes the treatment is easy, as the diet is the same in both (principally fat and albumin). Even the medicinal treatment of hyperchlorhydria (alkalies, sedatives) influences also the diabetes favorably.

It is different in achylia gastrica complicating diabetes. As is well known, meat is not well borne in achylia gastrica, whereas a vegetarian diet (plenty of carbohydrate) usually agrees best with these patients. We are thus confronted by a dilemma. The diabetes requires

a preponderance of animal, the achylia a preponderance of vegetable food. We must find a way to select the food so that while it is rich in protein and fat it still contains little meat.

In these cases a trial of the von Noorden oatmeal cure would be appropriate.

In numerous cases of such a combination of achylia and diabetes I have used the following diet list with advantage:

		Calories
Breakfast:	Three soft boiled eggs	240
	One roll (40 grams)	100
	Butter (30 grams)	251
	Coffee (200 grams) and cream (50 grams)	138
Dinner:	Beef tea (200 grams), with meat powder (30 grams)	118
	Three scrambled eggs	240
	Half a roll	50
	Butter (30 grams)	251
	Spinach or asparagus (50 grams)	82
Supper:	Two eggs beaten with 150 grams of milk and 50 grams of cream	394
	Mashed Potato (50 grams)	63
	Crackers (10 grams)	24
	Cream cheese (20 grams)	79
	Butter (30 grams)	251
9:30 P. M.:	300 grams of Kumyss with Almonds and nuts	100
		2,381

It is understood, of course, that this diet must be somewhat varied. I often use pea soups, although they contain a considerable amount of carbohydrates.

After the patient has lived on this diet for about one week, it is better to add for dinner some meat (chicken, calf's brain, sweetbread or chopped meat).

The main point in the treatment of these patients lies in the fact that they have to take more carbohydrates than usual and that they do better under this mode of treatment.

The urine naturally must also serve here as an indicator to determine whether or not the amount of carbohydrate is harmful.

Another class of digestive disturbances occurring in diabetics is that of catarrh of the stomach or bowel. We usually have to deal with acute affections of the stomach and bowel, or of both organs, produced by overfeeding with too greasy or too heavy food.

In these cases the dietetic treatment must be directed especially against the acute affections and we must leave the diabetes out of consideration.

A bland meager diet is the main thing (beef

tea, gruels, milk, possibly raw eggs beaten up in milk or beef tea). When the acute stage of the digestive disturbances is passed we can slowly return to the antidiabetic diet.

LECTURE IX

THE DIETETIC MANAGEMENT AND THE ALLEN TREATMENT OF DIABETES MELLITUS[1]

Diabetes is a true disease of disturbed metabolism. While digestion and absorption go on in a normal way, the assimilation of foods is at fault. In mild cases, the carbohydrates alone cannot be utilized. Instead of burning up and generating heat for the body economy, they are eliminated from the system in the form of sugar with the urine. In the severe forms, the proteins are split up partly into carbohydrate material, which latter again is not burned up but is excreted as such. In the still severer forms, fats (the third nutritive group) are likewise broken up into acid radicals, which again do not oxidize to their ultimate products, but circulate for a while in the blood stream as such, and are partly excreted with the urine (acidosis). The glucose, as well as the acid products, when accumulated in the system, act as irritants, pro-

[1] Read before the N. Y. Medical Union on January 23, 1917.

ducing abnormal conditions which give rise to the development of various diseases.

The treatment of diabetes, therefore, has for its object at first the freeing of the organism of both sugar and acids. The management of this disease,—in attempting to keep the body free from the above metabolic defects,—is then a question of diet, and this has played the greatest part in the treatment of this condition almost since the discovery of the disease. Rollo, in 1796, introduced an animal diet as a cure for diabetes, and this treatment has been more or less rigidly adhered to by most clinicians for over a century.

Bouchardat and Cantani recognized the evil results of a too liberal protein diet, and introduced green vegetables as an important factor in the treatment of this disease. Naunyn,[1] one of the greatest investigators of diabetes, likewise recognized the utility of green vegetables in the dietary regime of diabetes, and discovered the fact that fast days produce beneficial results, by not only clearing up the resistant glycosuria and improving tolerance, but also by at times warding off comatose conditions.

[1] Naunyn: Der Diabetes Mellitus Wien, 1906.

Von Noorden corroborated Naunyn's statements, and made use of fast days, especially when acidosis was present. He noticed the striking effect that fasting had upon the fall of acetone. In severe cases of diabetes with acidosis he instituted one fast day every week, with excellent results. Fasting in the treatment of diabetes has been frequently practised by Guelpa[1] of Paris. He insisted that the patient should fast for three days or more, with a bottle of Hunyadi Janos water each day, followed first by a milk and then a vegetable diet,—with occasional repetition of the fasting and purging. In mild cases, Guelpa noticed great benefit from this treatment.

While formerly most clinicians laid much stress upon keeping the organism of the diabetic patient in good condition and well nourished,—it was believed to be of essential importance to look out for a sufficient amount of food (see Lecture VIII),—Allen[2] was one of the first to break away from this maxim and to rather lay

[1] Guelpa: British Medical Journal, 1910, ii, p. 1050.

[2] F. M. Allen: "Studies Concerning Diabetes," Journal American Med. Association, 1914, p. 939.

F. M. Allen: "The Treatment of Diabetes," Boston Med. & Surg. Journal, 1915, p. 743.

the greatest stress upon keeping the diabetic patient free from sugar,—even, if necessary, at the cost of a loss of strength and body weight. Allen's ideas were quite revolutionary, and while his treatment was not new in every feature, it represented on the whole a great innovation and marked a long step in advance. From my own experience I can fully corroborate the statement which Joslin[1] uttered in 1915: "It is no exaggeration to say that the advance in the actual treatment of diabetes mellitus during the twelve months just passed has been greater than in any year since Rollo's time."

Before outlining Allen's plan of treatment, it will be well to state that at present the view prevails that diabetes mellitus is a disease caused by a disturbed function of the internal secretion of the pancreas, the islands of Langerhans being principally involved. In testing the experiences gained by noted clinicians in the field of diabetes, Allen made numerous experiments upon animals in which the pancreas had been to a great extent extirpated. He found that if the pancreas remnant in operated ani-

[1] E. B. Joslin: "Present Day Treatment and Prognosis in Diabetes." Amer. Jour. of Med. Sciences, 1915, p. 485.

mals is about one-tenth, the diabetes is permanent, even on a meat diet, and usually ends fatally.

A few days of fasting at the outset, however, will produce sugar freedom. If the diabetes is allowed to continue longer, a much longer period of fasting may be necessary for sugar-freedom, or it may be impossible to obtain it. If, after obtaining sugar freedom, feeding of protein and fat is begun very cautiously,—in quantity only enough to maintain the animal in its thin condition,—such animals remain free from diabetes. Increasing the weight of such an animal very soon produces glycosuria, which can be checked by renewed fasting. Animals made diabetic by carbohydrate diet, act in a similar way,—*i.e.*, they soon become sugar-free, after starving (F. M. Allen: Studies concerning Diabetes).

Allen then gives the following rules: Make patient sugar-free by fasting. Then gradually increase the food, according to the tolerance, and keep him steadily free from sugar. A loss of weight at first,—especially in a not too greatly emaciated individual,—is desirable. Never give a too high calorie diet, nor give too much protein. (Allen allows 1 gram of protein per day to a kilogram of weight). If the patient has lost

much in weight, he may be allowed, by increasing the fat in the food, to regain part of it, provided that no sugar reappears in the urine. As soon as the latter occurs, he must return to a lower calorie diet.

Exercise has been advocated as a means of furthering the combustion of the carbohydrates in the system. This factor Allen likewise utilizes in his plan of treatment. He rather thinks that brisk exercises are more efficacious than the milder forms. Fatigue, however, should always be avoided.

With regard to the details of treatment, Allen gives the following rules:

If the patient is moderately emaciated, with a negative carbohydrate balance and acidosis, he is put to bed and receives no food whatsoever. If coma seems imminent, the usual emergency treatment, with purging, stimulants, alkalies, and large amounts of water should, of course, be carried out. In addition to fasting, alcohol is important in the treatment at this stage. From 50 to 250 cc. of whiskey or brandy may be given in each twenty-four hours, in small doses,—from 10 to 20 cc., every one to three hours during the twenty-four. As soon as the glycosuria

stops and the acidosis diminishes, which even in severe cases may be within 48 to 96 hours, the amount of alcohol and alkali may be reduced. Fasting and moderate dosage of alcohol are continued for from twenty-four to forty-eight hours longer, however, depending on the patient's strength. The alkali is then stopped, and feeding with starch is commenced, in order to clear up the last traces of ketonuria.

Green vegetables are useful because their carbohydrate and food value is so low that they can be given in considerable bulk, and this bulk is agreeable to the patient for relieving his feeling of emptiness. Neither fat nor protein is added.

For the first day, the carbohydrate content is 10 to 40 grams, divided for four equal feedings, during the day. If glycosuria remains absent, the ration for the next day is doubled. There still being no sugar in the urine, the ration on the following day may be increased to 100 grams of carbohydrate. Should glycosuria reappear, another fast day is interposed,—from 50 to 200 cc. of whiskey being given. Even severe cases of ketonuria may by this method completely clear up.

The carbohydrate of the diet is seldom reduced

below 50 grams, and is preferably kept higher. If carbohydrate must be kept low, the total diet is kept low. The diet is so chosen that glycosuria, not ketonuria, is the signal of overstrain. Fasting-alcohol days are given not merely whenever this signal appears, but also at close enough intervals to prevent it from appearing,—even every two or three days,—if necessary.

No matter how low the assimilation power is, no attempt should be made to feed in excess of it. With the improvement in the condition of the patient, the carbohydrate is increased. Increase in weight, however, should not be attempted at this time. The metabolism is kept at the lowest safe level, until the patient is taking from 100 to 150 grams of carbohydrate (green vegetables) daily, with fast days interposed often enough to prevent any trace of glycosuria from appearing. The protein is cautiously added, always being kept low. In favorable cases the weight and well-being may finally improve under gradual additions of fat.

In milder cases, the treatment may be correspondingly milder. Primary loss of weight is intentional. When there is extreme cachexia and emaciation, the difficulty is greatest. The

alkali treatment is not employed unless for a brief period at the outset, while severe acidosis is being combatted. Even very severe cases are amenable to this mode of treatment. The best therapy lies, however, in the application of this principle of treatment at the earliest possible stage of diabetes.

Severe acidosis can be considerably reduced by prolonged fasting. Freedom from glycosuria seems attainable in all cases of uncomplicated human diabetes before there is danger of death from starvation. No contra-indication has been met, unless it be the appearance of nausea, vomiting, and prostration while fasting. Just as fasting is continued, not for any limited number of days but as long as necessary for sugar-freedom;—so also the diet is governed not by any theoretical standard of protein or calories, but by the amount of each food that can be given in each case while keeping the urine clear. Under this program, even weak and emaciated patients have been subjected to under-nutrition, in both protein and calories for weeks or months continuously, with ultimate benefit. Any trace of sugar is the signal for a fast day, with subsequent modifications of diet; and routine fast

days are often used as frequently as once a week, even in absence of glycosuria.

Two principles are important in the management of severe cases: To keep the patient permanently below weight, and to restrict the quantity of fat in the diet. The reduction in weight is beneficial to the diabetic patient, serving to spare the weakened function and increase tolerance. Sometimes a slight reduction of weight suffices even for a severe case. Again, a well-nourished patient, easily kept free from glycosuria, had to be reduced by 20 kilograms merely because of a slight stubborn ketonuria and a persistently high blood sugar. Most patients are able to regain weight, but few severe ones are able to return fully to normal weight. Any increase that is possible without return of symptoms is permitted. Any gain that brings back glycosuria or ketonuria is checked. The overtaxing of the patient's metabolism by giving fat beyond the limit of tolerance is an additional explanation of the failure to keep certain patients free from glycosuria and ketonuria under former methods of treatment.[1]

[1] F. M. Allen: "Prolonged Fasting in Diabetes." Am. Jour. Med. Sciences, 1915, p. 480.

I have used the alcohol during the fasting period with but a limited number of patients. Most of them do well without it. Bouillon, coffee, tea, and plenty of water are the essential ingredients needed during the fast.

The following regime may be observed:

1. The patient is made to fast until the urine is sugar-free. During this time he takes a cup of tea in the morning (8 A. M.); one to two cups of bouillon at noon (12:); one cup of coffee at 4 P. M.; and one to two cups of bouillon at 8 P. M. In between, he is encouraged to drink one and a half to two quarts of water, or Apollinaris or Vichy. He is allowed to walk, part of the time and to busy himself with reading, etc., but he must be warned not to get over-tired. When fatigued he should rest in a rocking chair or in bed.

2. The urine having become free from sugar, feeding with green vegetables is begun.

3. As soon as the carbohydrates can be given in an amount of about 80 to 100 grams a day without the appearance of sugar in the urine, protein is given,—at first about 20 grams (three eggs) a day. Thereafter the protein is increased by about 5 grams a day

until 1 gram of protein per kilo of body weight is reached.

4. This protein usually includes a small amount of fat, especially when eggs are eaten, but besides this amount fat is slowly added as such, by adding butter, cream or bacon to the diet. The amount of fat is slowly but steadily increased, —provided there is no ketonuria noticeable,— until the loss of weight is checked. The patient should, however, never get more than 30 to 40 Calories per kilo weight a day.

5. Whenever sugar reappears in the urine, a fast day should immediately be instituted. This will usually be enough to clear the urine of sugar. The diet is then resumed as before,—but about half the amount of carbohydrates is given at first, and then gradually increased again. But even if the patient continues sugar-free, one fast day a week should be maintained, especially in the severer forms of diabetes. In mild cases, this fast day can be replaced by one green vegetable day weekly,—the diet consisting merely of bouillon and green vegetables or salads.

Within the last two years, I have applied the Allen treatment in twenty cases of diabetes mellitus,—most of them were in the German

Hospital; a few in the Post-Graduate and in my private practice,—and have been satisfied with the results. In most instances the urine became free from sugar on the third or fourth day of fasting. Usually the patients stand the fasting period without much trouble. In one instance, however, this mode of treatment could not be carried out. The patient referred to was a lady of about thirty-four, who had diabetes of the mild type. On the second day of fasting I found her in a condition of extreme collapse. She was hardly able to talk and almost lifeless. At the time, I and the other physicians in the hospital considered her death near. Alkalies were given to her per rectum and stimulants applied, and at the same time the patient was encouraged to take nourishment regardless of its character. It took about four or five days of this mode of treatment to have the patient recuperate from her severe attack of shock. This shows that extreme care is required during the fasting period.

In the treatment of diabetes, the examination of the urine for sugar and acetone plays a most important part, especially with regard to the arrangement of the diet. For this reason I consider it advantageous to describe here the

most important tests for sugar and the acid bodies in the urine. Some clinicians consider it essential to teach the diabetic patients to perform these tests for themselves. This will not always be necessary, but will occasionally be quite appropriate. For the qualitative and quantitative determination of sugar, the Benedict test is very convenient.

Benedict's Test

Sol. A	*Sol. B*
Ammon. sulphate.. 1.2 gram	Potass. hydrate..... 20 grams.
Copper sulphate... 2.6 grams.	Glycerin..... 100 (grams.) cc.
Aquæ destill..... 50 c.c.	Aq. ammoniæ.....250 (grams.) cc. (S.G. 0.90)
	Aquæ destill: ad..... 500 cc.

Mix in proportion of Sol. *A* 1 part: Sol. *B* 9 parts.

Use 4 cc. of this solution.

Boil—and add urine drop by drop, with medicine dropper (*gtt.* 18 = 1 *c.c.*) until the blue color disappears completely.

Solution		4 *cc.*
Urine: gtt.		*Sugar, per cent*
1	=	6.0
2	=	3.0
3	=	2.0
4	=	1.5
5	=	1.2
6	=	1.0
7	=	0.85
8	=	0.75
9	=	0.66
10	=	0.6
12	=	0.5
24	=	0.25

This test, although quite accurate, has the disadvantage that it is based upon reduction, which is not specific for sugar, as there exist other reducing substances in the urine which may give rise to mistakes.

The fermentation test, which can be easily

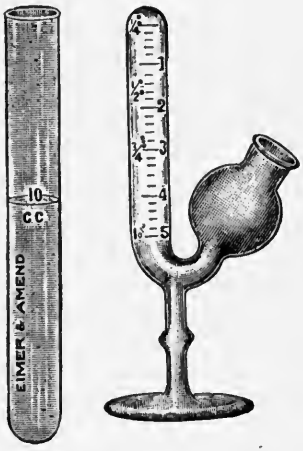

Fig. 1.—Einhorn's fermentation saccharometer. The fermentation saccharometer can be obtained at Eimer & Amend, 205 3rd. Ave., New York.

performed with the Fermentation Saccharometer, is the most positive proof of sugar, and herewith directions for its use are given.

Take 1 gram of commercial compressed yeast (or 1/16 of a cake of Fleischmann's Yeast) shake thoroughly in the graduated test tube with 10 cc. of the urine to be examined. Then pour the mixture into the bulb of the saccharometer. By inclining the apparatus the mixture will easily flow into the cylinder, thereby forcing out the air.

Owing to the atmospheric pressure the fluid does not flow back but remains there.

The apparatus is to be left undisturbed for twenty to twenty-four hours in a room of ordinary temperature.

If the urine contains sugar, the alcoholic fermentation begins in about twenty or thirty minutes. The evolved carbonic acid gas gathers at the top of the cylinder, forcing the fluid back into the bulb.

On the following day the upper part of the cylinder is filled with carbonic acid gas. The changed level of the fluid in the cylinder shows that the reaction has taken place and indicates by the numbers—to which it corresponds—the approximate quantity of sugar present.

If the urine contains more than 1 per cent. of sugar, it must be diluted with water before being tested.

Diabetic urines of straw color and a specific gravity of 1.018–1.022 may be diluted twice; of 1.022–1.028, five times; 1.028–1.038, ten times.

The original (not diluted) urine contains in proportion to the dilution two, five or ten times more sugar than the diluted urine.

In carrying out the fermentation test, it is always recommended to take besides the urine to be tested, a normal one, and to make the same fermentation test with it.

The mixture of the normal urine with the yeast will have on the following day only a small bubble on the top of the cylinder. This proves at once the efficacy and purity of the yeast.

Likewise if there is in the suspected urine a small bubble on the top of the cylinder, then *no* sugar is present, but if there is a much larger gas volume, then we are *sure* that the urine contains sugar.

Usually it is necessary to wait over night to determine the amount of sugar present. This is quite a disadvantage. Qualitatively, however, —and this is really the most important point to ascertain,—it is possible to discover the presence of sugar within half an hour after performing the test. In my paper entitled "Zum Gährungs-sacharometer,"[1] I showed that 1 per cent, of

[1] Deutsch. Med. Wochenschr. 1891, No. 13.

sugar, and even less, down to ¼ per cent, can be positively recognized after a half hour's time. One-tenth of 1 per cent of sugar can be recognized after one hour, provided the test is made with a control specimen of normal urine at the same time. In the urine containing sugar

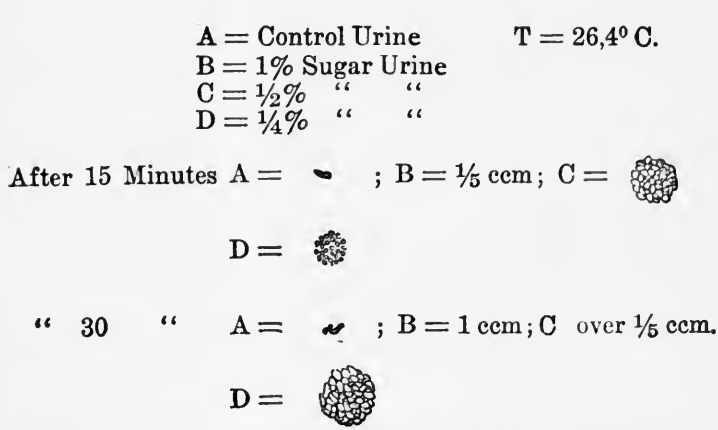

Fig. 2—The bubbles forming on the top of saccharometer soon after performing the test.

a few bubbles appear at the top of the saccharometer pretty soon after the test has been performed. I herewith give an illustration of the tiny bubbles forming, taken from the paper, just mentioned.

With regard to ketonuria, the following tests are of importance:

Acetone Test

Urine, 5 cc.
Acidify with glacial acetic acid.
Add few drops sol. sod. nitroprusside (aqueous) 10 per cent.
Shake.
Add ammonia hydrate until alkaline.
Reaction = Purple color indicates acetone.

Diacetic Acid

Urine, 5 cc.
Add excess of ferric-chloride.
Reaction = Burgundy red indicates diacetic acid.

Quant. Ammonia Test

Urine, 5 cc.
Add 1 cc. of sat. sol. potass. oxalate.
Add gtt. 2 sol. phenolphthalein.
Add N/10 NaOH to faint pink color.
Add 1 cc. formalin (neutral).
Add N/10 NaOH to faint pink color.
Each cubic centimeter of N/10 NaOH used in last titration = 1 cc. N/10 ammonia or .0017 grams. ammonia.
Multiply this by number of cubic centimeter N/10 NaOH used in last titration = Number of grams. of ammonia in 5 cc. urines.

In order to more easily arrange the bill of fare for the diabetic patient, two tables of the most common foods are herewith given, one arranged according to the per cent of carbohydrate after Joslin, the other stating the content of the nutritive material,—proteins, carbohydrates, and fats (caloric value).

I. Foods Arranged According to Per Cent of Carbohydrate (Joslin [1])

Vegetables[1] (fresh or canned) 5 per cent	10 per cent	15 per cent	20 per cent
Lettuce	Pumpkin	Green peas	Potatoes
Cucumbers	Turnip	Artichokes	Shell beans
Spinach	Kohl-rabi	Parsnips	Baked beans
Asparagus	Squash	Canned lima beans	Green corn
Rhubarb	Beets		Boiled rice
Endive	Carrots		Boiled macaroni
Marrow	Onions		
Sorrel	Mushrooms		
Sauer kraut			
Beet greens			
Dandelions			
Swiss chard			
Celery			
Tomatoes			
Brussels sprouts			
Water cress			
Sea kale			
Okra			
Cauliflower			
Egg plant			
Cabbage			
Radishes			
Leeks			
String beans			
Broccali			
Fruits			
Ripe olives (20 per cent fat)	Lemons	Apples	Plums
Grape fruit	Oranges	Pears	Bananas
	Cranberries	Apricots	Prunes
	Strawberries	Blueberries	
	Blackberries	Cherries	
	Gooseberries	Currants	
	Peaches	Raspberries	
	Pineapple	Huckleberries	
	Watermelon		
Nuts			
Butternuts	Brazil nuts	Almonds	Peanuts
Pignolias	Black walnuts	Walnuts—(English)	
	Hickory	Beechnuts	
	Pecans	Pistachios	40 per cent
	Filberts	Pine nuts	Chestnuts
Miscellaneous	[1] Reckon available carbohydrates in vegetables of 5 per cent group as 3 per cent. Reckon available carbohydrates in vegetables of 10 per cent group as 6 per cent.		
Unsweetened and unspiced Pickle, clams, oysters, scallops, liver, fish roe			

[1] E. P. Joslin: "The Treatment of Diabetes Mellitus," Phila., 1916.

As an example of the management of diabetic cases, I give the exact bill of fare of patient P. during her stay in the German Hospital. (See pp. 140–146.)

II. Table of Foods Frequently Used in Diabetes: With Nutritive Values in 100 Grames

	Protein, grams	Fat, grams	Carbohydrate, grams	Total, calories
Asparagus (canned)	2.0	1.0	3.0	30.0
String beans (fresh cooked)	1.0	1.0	2.0	22.0
Lettuce (raw)	1.0	0.3	3.0	19.0
Cauliflower (raw)	2.0	0.5	5.0	33.0
Spinach	2.0	0.3	3.0	23.0
Green peas (raw)	7.0	0.5	16.0	99.0
Potatoes (white)	2.0	0.1	18.0	83.0
Peas (dried)	24.0	1.0	62.0	362.0
Butter[4]	....	84.0	....	780.0
Milk (whole)	3.0	4.0	5.0	70.0
Milk (skim)	3.0	0.3	5.0	35.0
Cheese (neufchatel) "2 ¼ × 1½ × 1¼"	16.0	23.0	1.0	284.0
Cream (gravity)	3.0	16.0	5.0	181.0
Bacon (raw) 4 slices, 6 × 2	10.0	64.0	....	636.0
Bacon (cooked) 4 slices, 6 × 2	10.0	46.0	....	468.0
Egg[3]	14.0	12.0	....	168.0
Oysters (6 large)	6.0	1.0	3.0	46.0
Oatmeal (cooked)	3.0	0.5	12.0	66.0
Rice (cooked)	3.0	0.1	24.0	112.0
Bread	7.0	0.5	55.0	260.0
Grapefruit[1]	0.6	....	10.0	43.0
Orange[2]	0.7	....	9.0	38.0
Watermelon	0.4	0.2	7.0	32.0
Bananas	1.0	0.6	22.0	100.0
Walnuts	18.0	64.0	13.0	722.0
Almonds	21.0	54.0	17.0	658.0
Peanuts	25.0	38.0	24.0	546.0

[1] Small fruit = 300 grams.

[2] Medium fruit = 150 grams.

[3] 1 Egg (medium) = 50 grams.

[4] One-forth-inch cube = 30 grams.

MRS. P., WEIGHT 132 POUNDS, ENTERED HOSPITAL JAN. 16, 1917, AT NOON

Date and hour	Food intake	Total for 24 hours	Urine									
			Proteid	Carbohydrate	Fat	Calories	Amount in 24 hr.	Specific gravity	Sugar	Albumin	Acetone	Ammonia
1/16/17 11:30 A. M. 3 P. M. 5 P. M. 8:30	Broth, ℥v Bran biscuits Broth, ℥vi Broth, ℥vi	Broth ℥xvii: water, 2 quarts (510 gm.)					1500 cc.	1030	3%			0.7
		Total.....	2		3	35.7						
1/17/17 8 A. M. 10 A. M. 1 P. M. 6 P. M. 8 P. M. 10 P. M.	Broth, ℥iii Broth, ℥ix Broth, ℥xii Broth, ℥xii Broth, ℥vi Whiskey, ℥i	Broth, 42 ℥: gm. 1260 Whiskey, ℥i, gm. 30 Water, 2 quarts					950 cc.	1.004	0.5 %	Neg.	Neg.	0.53
		Total.....	2		3	193.2						
1/18/17 8:30 A. M. 8:30 A. M. 11:30 1 P. M. 5 P. M. 6 P. M. 9 P. M.	Broth, ℥xii Whiskey, ℥i Whiskey, ℥i Broth, ℥xii Whiskey, ℥i Broth, ℥xii Broth, ℥xii	Broth, ℥48: gm. 1440 Whiskey, ℥iii gm. 90 Water 2 quarts					1700 cc.	1.004	Neg.	Neg.	Neg.	0.672
		Total for 24 hr.....	2		3	415.8						

Date and hour	Food intake	Total for 24 hours	Urine									
			Proteid	Carbohydrate	Fat	Calories	Amount in 24 hr.	Specific gravity	Sugar	Albumin	Acetone	Ammonia
1/19/17							900 c.c.	1.006	Neg.	Neg.	Neg.	1.25
8:30 A. M.	Tea with lemon, ℥vii	Broth, xvii: gm. 510										
10 A. M.	Broth, ℥xii	String beans: ℥x: gm. 300										
11:30 A. M.	Whiskey, ℥i											
12:30	String beans, o ℥. x	Cauliflower, ℥x: gm. 300										
3 P. M.	Tea with lemon, ℥vii											
4:30 P. M.	Whiskey, ℥i	Tea with lemon, ℥xiv: gm. 420										
5:30	Cauliflower, ℥x											
8 P. M.	Broth, ℥v	Water, 2 quarts										
9:30	Whiskey, ℥i											
		Total for 24 hr.....	26	24	5.4	256						
1/20/17							1000 c.c.	1.010	Neg.	Neg.	Neg.	
8:30 A. M.	Boiled egg (2)	Boiled eggs (4): gm 200										
8:30	Tea with lemon	String beans, ℥x: gm. 300										
	Bran biscuits (2)											
10:30	Broth with egg (1) ℥xii	Cauliflower. ℥x: gm. 300										
11:30	Whiskey, ℥i											
2 P. M.	Beans, ℥x	Broth, ℥xvii: gm. 510										
3:30	Whiskey, ℥i											
5:30	Cauliflower, ℥x	Tea with lemon, ℥xiv: gm. 420										
	Tea & lemon, ℥vii											
8 P. M.	Egg (1)	Whiskey, ℥iii: gm. 90										
10 P. M.	Whiskey, ℥i	Bran biscuits (2)										
1 A. M.	Broth, ℥v											
		Total for 24 hr.....	51	25	29.4	900						

1/21/17		Boiled eggs (4): gm. 200					1100 cc.	1.004	Neg.	Neg.	Neg.	1.7
8:30	Eggs boiled (2)	Broth, ℥xii: gm. 360										
	Bran biscuits (2)	String beans, ℥x: gm. 300										
10:30	Broth, ℥xii	Cauliflower, ℥x: gm. 300										
1 P. M	Beans, ℥x	Celery, ℥x: gm. 300										
	Celery, ℥x	Bran biscuits (2)										
	Egg boiled (1)	Whiskey: ℥iii: gm. 90										
3 P. M	Tea with lemon											
4:30	Whiskey, ℥i											
5:30	Cauliflower, ℥x											
	Egg boiled (1)											
8 P. M.	Whiskey, ℥i											
		Total for 24 hr.....	63	37	30	1004						
1/22/17							1609 cc.	1.008	Neg.	Neg.	Neg.	2.12
9 A. M.	Eggs boiled (2)	Boiled eggs, (4): gm. 200										
	Bran biscuits (2)	Broth, ℥xii: gm. 360										
	Tea with lemon, ℥vii	String beans: ℥x: gm. 300										
10:30	Broth, ℥xii	Cauliflower, ℥x: gm. 300										
11:30	Whiskey, ℥i	Celery: ℥x: gm. 300										
12:30	Egg boiled, (1)	Whiskey, ℥iii: gm. 90										
	String beans, ℥x	Bran biscuit (2)										
	Celery, ℥x											
3 P. M	Tea with lemon, ℥vii											
4:30	Whiskey, ℥i											
5:30	Cauliflower, ℥x											
	Egg boiled (1)											
9 P. M.	Whiskey, ℥i											
	Liq. ammon. anis	Total for 24 hr.....	63	37	30	1004						
1/23/17							1100 cc.	1.010	Neg.	Neg.	Neg.	2.9
8:30	Eggs (2)	Boiled eggs (4): gm. 200										
	Bran biscuits (2)	Broth, ℥xii: gm. 360										
	Tea with lemon	Cauliflower, ℥x: gm. 300										
10:30	Broth, ℥xii	String beans, ℥x: gm. 300										
11:30	Whiskey, ℥i	Celery, ℥x: gm. 300										
12:30	Lamb chops, ℥ii	Brussel sprouts, ℥x: gms. 300										
	Cauliflower, ℥x	Lamb chop, ℥ii: gm. 60										
	String beans, ℥x	Whiskey, ℥iii: gm. 90										
3 P. M.	Tea with lemon	Tea with lemon										
4:30 P. M.	Whiskey, ℥i	Bran biscuits (3)										
5:30	Celery, ℥x											
	Brussel sprouts, ℥x											
	Boiled egg (1)											
	Bran biscuit (1)											
9 P. M.	Whiskey, ℥i											
	Liq. ammon. anis	Total for 24 hr.....	85	50	35	1194						

Date and hour	Food intake	Total for 24 hours	Urine									
			Proteid	Carbohydrate	Fat	Calories	Amount in 24 hr.	Specific gravity	Sugar	Albumin	Acetone	Ammonia
1/24/17		Boiled eggs (3): gm. 150					800 cc.	1.012	Neg.	Neg.	Neg.	
8:30	Eggs (2)	Broth, ℥x: gm. 300										
	Tea with lemon	Cauliflower, ℥x: gm. 300										
	Bran biscuits (2)	String beans, ℥x: gm.: 300										
10:30	Broth, ℥xii	Celery, ℥x,: gm. 300										
11:30	Whiskey, ℥i	Brussel sprouts: ℥x: 300										
12:30	Lamb chops, ℥ii	Whiskey, ℥iii: gm. 90										
	Cauliflower, ℥x	Bran biscuits (3)										
	String beans, ℥x	Lamb chop, ℥ii; gm. 60										
3 P. M.	Tea with lemon	Tea with lemon										
4:30 P. M.	Whiskey, ℥i											
5:30 P. M.	Celery, ℥x											
	Sprouts, ℥x											
	Egg boiled (1)											
	Bran biscuit (1)											
9 P. M.	Whiskey, ℥i											
	Liq. ammon. anis											
		Total for 24 hr.....	89	61	18	1097						

1/25/17	Eggs (2)	Boiled eggs (3)					700 cc.	1.012	Neg.	Neg.	Neg.	2.66
8:30	Tea with (cream; ʒii)	Broth, ʒxxii: gm. 660										
	Bran biscuits (2)	Cauliflower, ʒx: gm. 300										
	Broth, ʒxii											
10:30	Whiskey: ʒi	String beans, ʒx: gm. 300										
11:30	Lamb chops, ʒii											
12:30	Cauliflower, ʒx	Brussels sprouts: ʒx: gm. 300										
	String beans, ʒx											
	Tea with (cream, ʒii)	Lamb chop, ʒii: gm. 60										
3 P. M.	Whiskey, ʒi	Raw oysters (6)										
4:30	Celery, ʒx	Whiskey: ʒiii: gm. 90										
5:30	Sprouts, ʒx	Bran biscuit (3)										
	Oysters raw, (6)											
	Boiled egg (1)											
	Bran biscuit (1)											
	Liq. ammon. anis ♏ viii t.i.d.	Total for 24 hr.....	66	37	17	945.4						
1/26/17							800 cc.	1.008	Neg.	Neg.	Neg.	2.89
8:30	Eggs (2)	Boiled eggs (3): gm.150										
	Bran biscuit (2)	Broth, ʒxxii: gm. 660										
	Tea with (cream, ʒii)	Cauliflower, ʒx: gm. 300										
10:30	Broth, ʒxii											
11:30	Whiskey, ʒi	String beans, ʒx: gm. 300										
12:30	Lamb chops, ʒii											
	Cauliflower, ʒx	Brussels sprouts, ʒx: gm. 300										
	String beans, ʒx											
3 P. M.	Broth, ʒxii	Raw oysters (6)										
4:30	Whiskey, ʒi	Whiskey, ʒiii: gm. 90										
5:30	Raw oysters (6)	Bran biscuits (3)										
	Egg boiled (1)	Lamb chop, ʒii: gm. 60										
	Sprouts, ʒx	Tea (with cream, ʒiv: gm. 120)										
9 P. M.	Whiskey, ʒi											
	Liq. ammon. anis, ♏ viii t.i.d.	Total for 24 hr.....	70	41	43.9	1234						

Date and hour	Food intake	Total for 24 hours	Urine									
			Proteid	Carbohydrate	Fat	Calories	Amount in 24 hr.	Specific gravity	Sugar	Albumin	Acetone	Ammonia
1/27/17							900 cc.	1.006	Neg.	Neg.	Neg.	2.61
8:30	Raw apple (1)	Boiled eggs (3): gm. 150										
	Eggs (2)	Broth, ℥xxii: gm. 660										
	Roll (1)	Cauliflower, ℥x: gm. 300										
	Tea with cream	String beans, ℥x: gm. 300										
10:30	Broth, ℥x	Brussel sprouts, ℥x: gm. 300										
11:30	Whiskey, ℥i	Egg plant, ℥x: gm. 150										
12:30	Lamb chops, ℥ii	Raw oysters (6)										
	Cauliflower, ℥x	Lamb chop, ℥ii: gms. 60										
	String beans, ℥x	Tea (cream, ℥iv: gm.120										
3 P. M.	Broth, ℥xii	Bran biscuit (2)										
4:30	Whiskey, ℥i	White bread roll (1)										
5:30	Raw oyster (6)	Whiskey, ℥ii, gm. 60										
	Boiled egg (1)	Raw apple, (1)										
	Sprouts, ℥x											
	Bran biscuit (2)											
9 P. M.	Whiskey, ℥i											
	Liq. ammon. anis, ♏ viii t.i.d.											
		Total for 24 hr......	79	68	45	1282						

1/28/17		Boiled eggs (2) gm. 100								
8:30	Eggs (2)	Broth, ℥x: gm. 300								
	Raw apple (1)	Cauliflower, ℥x: gm. 300								
	Roll (1)	Egg plant, ℥x: gm. 300								
	Tea with (cream, ℥ii)	Raw oysters (6)								
10:30	Broth, ℥xii	Beefsteak, ℥ii: gm. 60								
11:30	Whiskey, ℥i	Tea (cream, ℥iv: gm. 120								
12:30	Beefsteak, oz. ii	Butter, gm. 4								
	Cauliflower, ℥x	White bread Roll (1)								
	Egg plant, ℥x	Whiskey, ℥ii: gm. 60								
3 P. M.	Tea with (cream, ℥ii)	Raw apple (1)								
4:30 P. M.	Whiskey, ℥i									
5 P. M.	Raw oysters, (6)									
	Egg boiled (1)									
	Bran biscuit (2)									
9 P. M.	Whiskey, ℥i									
		Total for 24 hr.....	55	50	60	1298	800 cc.	1.012	Neg.	Neg.	Neg.

Jan. 29, 1917.—Patiet discharged from the hospital.

Feb. 10, 1917.—She is now taking nourishment amounting to a caloric value of 2000 daily, is not losing in weight and has no sugar in the urine.

LECTURE X

THE DIETETIC MANAGEMENT OF GOUT

Luxurious living and to a certain degree an abuse of alcohol have been recognized as playing a part in the origin of gout. Accordingly up to within the last twenty years an abstemious diet consisting principally of vegetables and the exclusion of alcoholic beverages formed the principal part of the dietetic treatment of this disease.

In gouty conditions uric acid deposits can be discovered in various parts of the body (principally the joints, connective tissue, and bones). Garrod[1] showed the presence of uric acid in the blood of the gouty, thus revealing the relationship of uric acid to this disease. The origin of the uric acid had been believed to be a metabolic product of the albuminates, similar to urea.

This appeared to confirm the necessity of restricting the protein foods generally in the diet of gout.

[1] A. B. Garrod: Nature and Treatment of Gout, Würzburg, 1861.

A change of this view has been accomplished by the important investigations and the great discoveries in the metabolic process of the nucleoproteins, by Miescher[1] and Kossel,[2] Horbaczewski,[3] Schittenhelm,[4] E. Fischer,[5] Brugsch,[6] Wiener,[7] Bessau and Schmid[8] and C. von Noorden.[9]

It has been shown by these investigators that uric acid as well as all nucleoproteins (both animal and vegetable) contain in their chemical construction a common atom group, the so-called "purin ring" of five C (carbon) and four N (nitrogen) atoms. The same experiments have proven that uric acid ($C_5H_4N_4O_3$) or trioxypurin is derived in the metabolic process

[1] F. Miescher: Physiologisch-chemische Untersuchungen über die Lachsmilch Arch. f. exper. Pathol. und Pharmak., 1895, vol. 37, p. 100.

[2] A. Kossel: Untersuchungen über die Nucleine und deren Spaltprodukte, Strassburg, 1881.

[3] J. Horbaczewski: Untersuchunden über die Entstehung der Harnsäure. Monatshefte f. Chemie, x, 1889, p. 624.

[4] A. Schittenhelm: Der Nukleinstoffwechsel. Handbuch der Biochemie (C. Oppenheimer) 1910, iv, p. 489.

[5] E. Fischer: Untersuchungen über die Puringruppe, Berlin, 1907.

[6] T. L. Brugsch: See Brugsch und Schittenhelm. Der Nukleinstoffwechsel und seine Stoerungen, June, 1910.

[7] H. Wiener: Die Harnsäure in ihrer Bedeutung für die Pathologie. Ergebnisse der Physiol., 1903, 11 i Abt., p. 377.

[8] G. Bressau und J. Schmid: Die Diätetik bei harnsaurer Diathese und Gicht. Therap. Monatsheft, 1910, v. 24, p. 116.

[9] C. von Noorden, Die Gicht: Lehrbuch der Pathol. des Stoffwechsels. ii, Aufl., Bd. ii, p. 138, Berlin, 1907.

of the nucleoprotein digestion by ferment action. Normally the uric acid derived in the body of the nucleinic acid is partly still further changed to products not yet known, while some of it between 40–50 per cent, sometimes much less, appears in the urine as such.

The uric acid originating from the nuclei of the body cells proper is designated as "endogenous" while that derived from the outside material (animal or vegetable foods containing purin bodies) as "exogenous."

In health, when living on a purin-free diet, the blood does not reveal the presence of uric acid. After a purin-rich diet there appears in the blood uric acid for a short period, but very soon it is totally eliminated with the urine, and becomes free again.

In gouty individuals this is quite different. The blood always shows the presence of uric acid even when no purin foods have been indulged in for a long time. Again, after a purin-rich diet the healthy reacts differently from the gouty.

After such an event the normal individual shows quickly for a short while uric acid in the blood "uricemia" which is followed by an increased elimination of this exogenous uric

acid with the urine. The gouty on the other hand develops an increase of his usual uricemia but slowly and the exogenous uric acid is not eliminated by the kidneys quickly but at a much slower rate and imperfectly.

Following the teachings of Brugsch, Schittenhelm and Schmid in gout the entire cycle of the purin metabolism is disturbed. The organism is not able to manufacture or destroy the uric acid products as efficiently as in health.

The above explanations make it clear that in addition to the former dietetic management of gout a new principle will have to be added namely a purin-free diet.

Just the same as in diabetes mellitus, abstinence of starchy foods, totally or to a certain degree, according to the existing tolerance, is the mainstay of the treatment, so in gout the restriction of purin foods forms the essential part of the regime.

The dietetic management of the gouty will culminate in two principles:

1. Increased metabolism and elimination of the purin bodies.

2. Strict avoidance or diminution of the ingestion of purin-containing foods.

The first point is best accomplished by flushing the system with fluids (water), and gradually increased muscular exercises (walking, massage, vibratory massage, electro- and hydrotherapy).

The second point consists in a strict observance of a purin-free diet for a more or less prolonged period of time.

In order to facilitate a dietary plan in gout we give in the following Schmid and Bessau's table of the purin content of the more important common foods:

TABLE OF THE PURIN CONTENT OF THE COMMON FOODS (AFTER BESSAU AND SCHMID[1])

100 grams	Amount of purin bodies in grams	The purin bodies computed as represented in uric acid in grams
Meats		
Beef	0.0375	0.111
Calf	0.0385	0.114
Mutton	0.0265	0.078
Pork	0.0412	0.123
Tongue (calf)	0.0552	0.165
Liver sausage	0.0380	0.114
Salami sausage	0.0235	0.069
Blood sausage		
Bouillon	0.059	0.045
Brain (swine)	0.0282	0.084
Liver (ox)	0.0935	0.279
Kidney (ox)	0.0804	0.240
Thymus (calf)	0.330	0.990
Lungs (calf)	0.0525	0.156
Chicken	0.0292	0.087
Pigeon	0.0585	0.174
Goose	0.0336	0.099
Deer	0.0393	0.177
Pheasant	0.0345	0.012

[1] Cited after Schittenhelm & Schmid: Die Gicht und ihre diätetische Therapie. Albu's Verdsunngs-und Stoffwechselkrankh, ii, Heft 7, 1910.

100 grams	Amount of purin bodies in grams	The purin bodies computed as represented in uric acid in grams
Fish		
Haddock	0.0392	0.117
Tench	0.0271	0.084
Codfish	0.0387	0.144
Eel (smoked)	0.276	0.081
Salmon (fresh)	0.0244	0.072
Carp	0.0542	0.162
Pike perch	0.0458	0.135
Pickerel	0.0485	0.144
Herring	0.0690	0.207
Trout	0.0565	0.168
Sardines	0.1182	0.354
Sardelles	0.0780	0.234
Anchovis	0.1450	0.465
Crawfish	0.0200	0.060
Lobster	0.0228	0.066
Oysters	0.0297	0.087
Eggs		
Chicken eggs	0	0
Caviar	0	0
Milk and Cheese		
Milk	0	0
Edam cheese	0	0
Swiss cheese	0	0
Roquefort cheese	0	0
Gervais cheese	0	0
Cream cheese	0.0056	0.015
Vegetables		
Cucumbers	0	0
Lettuce	0.0030	0.009
Radishes	0.0052	0.015
Cauliflower	0.0084	0.024
Shives	traces	traces
Spinach	0.0244	0.072
White cabbage	0	0
Carrots	0	0
Rampion	0.0115	0.033
Kohl-rabi	0.0113	0.033
Celery	0.0056	0.015
Asparagus	0.0081	0.024
Onions	0	0
String beans	0.0021	0.006
Potatoes	0.0026	0.006
Mushrooms		
Pepper mushroom	0.0185	0.054
Morils	0.0112	0.033
Champignons	0.0051	0.015
Fruits		
Bananas	0	0
Pineapples	0	0
Peaches	0	0
Grapes	0	0
Tomatoes	0	0
Pears	0	0
Prunes	0	0
Cranberries	0	0

100 grams	Amount of purin bodies in grams	The purin bodies computed as represented in uric acid in grams
Oranges	0	0
Apricots	0	0
Blue berries	0	0
Apples	0	0
Almonds	0	0
Hazel nuts	0	0
Walnuts	0	0
Leguminous Fruits		
Green peas	0.0274	0.081
Dried peas	0.0185	0.162
Beans	0.017	0.051
Cereals		
Farina	0	0
Barley	0	0
Rice	0	0
Tapioca	0	0
Sage	0	0
Oatmeal	0	0
M llet	0	0
Breads		
Rolls	0	0
White bread	0	0
Ammunition bread	trace	trace
Pumpernickel	0.0035	0.009
Beverages		
Kulmbacher beer[1]	0.0010	0.012
Plain beer[1]	0.0040	0.003
Rum	0	0
Claret	0	0

[1] In one liter.

In looking over the above table it is evident that all the glandular organs of the animal body are rich in purin bodies: thus thymus (or sweet bread) contains 0.3%, liver 0.09%, kidney 0.08%. There is not much difference in the purin content of dark and white meats or between meat of animals or fish.

Eggs (all kinds including caviar), milk and its products (kumyss, cheese) all kinds of fruits

(also nuts), and cereals and their products (bread and rolls), are purin free.

Leguminous vegetables are rich in purin, especially lentils, containing 0.05%. Of the beverages clarets and rum are purin free, while beer contains 0.0004% purin bodies. Coffee, tea, and cocoa are rich in purin.

The above items with regard to the purin content of the different foods and drinks make it easy to arrange a diet for the gouty.

In doing this it is best to separate the dietary regime for the acute attack of gout and that for the chronic state.

THE DIET IN ACUTE GOUT

Strictly purin-free liquid and semisolid foods will have to be given. Milk, gruels, mineral waters, orangeade, lemonade and fruit gelées will form the main diet. Patient should ingest 2–3 quarts of fluids daily.

As soon as the severe pains have subsided and the appetite has returned additions to the above bill of fare of crackers, and toast with butter, cereals, and eggs are instituted.

THE DIET IN CHRONIC GOUT

A purin-free diet just sufficient to introduce enough calories to keep the patient from losing forms the principal plan of the regime.

The reason why a liberal quantity of food (overnutrition) is not permissible, lies in the fact that sumptuous living favors an increase of the endogenous uric acid formation. Simple living and scanty food with plenty of water diminishes the amount of endogenous uric acid developed in the organism and increases its elimination.

Purin-free foods should first be given. Later on foods containing small quantities of purin bodies can be added to the purin-free diet. Purin-free food days should be interposed at certain intervals, depending upon the patients ability to keep his blood free from uric acid.

A purin-free bill of fare is the following:

Breakfast.—Oatmeal with cream, rolls and butter, honey; a cupful or two of milk.

Lunch.—An orange or pear or baked apple: Eggs boiled or scrambled; bread and butter; boiled cucumber, or carrots or white cabbage; rice with milk, cheese and crackers.

Dinner.—Cream soup with tapioca, sago or

farina; scrambled eggs or omelettes; rolls and butter; caviar; boiled onions or carrots; banana with cream; almonds and nuts; butter milk.

As soon as a diet containing a small amount of purin bodies is permissible the following foods can be added: brown cabbage, asparagus, potatoes, celery, chicken, mutton; salmon, eel, oysters, lobster.

LECTURE XI

THE DIET IN THE DISEASES OF THE KIDNEYS

The kidneys are entrusted by the organism with two very important functions: (1) to excrete waste products, unnecessary material, and superfluous fluids (water) from the body; (2) to retain all material valuable to the system. The blood in passing through the glomeruli is subjected to a scrutinous examination by the renal cells, and the double function just mentioned is in this way carried out.

In disturbances of the kidneys two sets of phenomena are noticeable: (*a*) accumulation in the blood of substances which should have been eliminated; (*b*) excretion from the blood of material that should have been retained.

The symptoms encountered in renal affections are all more or less dependent upon the above two factors, which are present either in association with each other or separately. The gravity of the disease is likewise subject to the extent of functional failure in these two directions.

[1] The Medical Clinics of North America, November, 1917.

Alimentation which consists in the introduction and working up of new nutritive material manifestly increases the difficulties against which the kidneys have to battle. The importance of diet has therefore, always been recognized as one of the principal factors in the treatment of renal affections.

I chose this subject for discussion on account of the many interesting points it presents to the clinician.

The views regarding nephritis have undergone many changes in the course of the last century. At first it was generally believed that the main object of diet should consist in replenishing the lost albumen and for this reason richly protein foods (meats) were given. Soon, however, it was discovered that under this regime the nephritics did not show the desired improvement, and rather became worse. This led to the selection of a diet containing very little protein, and as such, milk was recommended. This valuable food still forms the mainstay in this disease.

If we take into consideration the great variety of symptoms met with in nephritics, it is at once clear that one and the same diet will not fit every case. Thus a patient with edematous

swellings all over and chloride of sodium retention will require a salt-free diet and restriction of fluid, while another with almost natural water and chloride of sodium excretion, will be able to take fluids and a moderate amount of salt.

With regard to diet, the affections of the kidneys will have to be divided into the following groups:

1. Acute conditions (nephritis acute), including exacerbations of chronic states.
2. Chronic affections:
   (*a*) parenchymatous nephritis.
   (*b*) interstitial nephritis.
   (*c*) congestive nephritis.
3. Complications:
   (*a*) Uremia; (*b*) Dropsy.

1. In **acute nephritis** (sudden onset of disease, edematous swellings, diminished urinary secretion, much albumen casts, etc.) including exacerbations of the chronic kidney lesions (which present similar symptoms), the diet and in fact the entire plan of treatment is guided by the principle of rest. Milk, gruels, and mineral or plain water are given in quantities of about 150. cc (℥V) every 2 hours or so. If cow's milk

is not well borne, a vegetable milk (prepared of nuts or sweet almonds) may be given instead. Meat soups (containing extractive material) and foods rich in protein are forbidden. Lemonade and fruit juices can be given. The work of the kidney is reduced to a minimum and its function partially replaced by other eliminative organs (skin and intestine). With this object in view, the diet can be of assistance. Hot drinks even in small quantities, like lemonade or weak tea, will act as a sudorific, while fruits (containing organic acids) will increase the intestinal activity. As soon as the acute symptoms begin to subside, the diet should be increased. The latter also applies to acute conditions lasting a longer time (10 days, 2–3 weeks etc.). Here likewise more food should be given. The patients are fed on milk, gruels, porridges, bread, 2–3 eggs (boiled or scrambled) and fruits. As little salt and seasoning as possible should be permitted in the diet.

2. **The diet in chronic affection of the kidneys.** (*a*) *Chronic parenchymatous nephritis* (face, pale and edematous, urine of moderately light specific gravity containing albumen and casts.)

This forms a class of cases in which a great

many practitioners prescribe a milk diet and keep it up indefinitely. While milk presents an ideal food for these patients and may be used with advantage for a week or two at a time, it should not form the only means of nourishment for a prolonged time. Although the kidneys are given more rest under this regime, the organism suffers from this onesided and at times insufficient alimentation. The anemia, here generally present, is enhanced and thus the conditions are unfavorable for the recuperation of any diseased organ. The consequence is that the kidney not withstanding its diminished activity, does not recover. A more liberal diet although requiring more strenuous work from the kidney creates a more healthful state of the individual and gives the affected organ a better chance for recovery.

The daily diet will therefore consist of the following:

Milk or kumyss, about a quart, gruel or porridge about one pint (given in two portions), 2–3 eggs (soft boiled, scrambled or poached), tender meat, preferably the white kinds (about 3–4 ounces), bread and butter; weak tea or weak coffee with sugar; light vegetables and

fruits. Table salt should be avoided, and the dishes prepared if possible, without salt; seasoning substances, pepper, onion, mustard and the like, should likewise be avoided. Meat soups and broths should be forbidden. The amount of fluid including that contained in the food, should not be more than two quarts and a half in 24 hours.

Great variety in the selection and preparation of the foods is very desirable, for the appetite of the nephritic is usually poor and requires as much stimulation as possible. The patients should be encouraged to eat, and everything should be done to raise the nutritive state of the organism.

(*b*) *Chronic interstitial nephritis* (patient usually well nourished with a florid complexion and high strung temperament: urine pale, abundant in quantity, of a diminished specific gravity, with little albumen and but few casts and sufficient sodium chlorid excretion; the blood pressure is usually high).

This form of nephritis is frequently encountered in plethoric and stout individuals. Luxurious living, high tension in business or professional activities and diminished mental rest as well

as lessened muscular exercises greatly contribute toward the development of interstitial nephritis. Tobacco and alcohol are here also contributory factors.

The dietary regime will be of a restricting type. Simple foods in moderate quantities with but scanty protein, should be given. Purin containing aliments, alcoholic beverages and spices should be prohibited. The physician will have to guard the patient against taking too large an amount of food. In fact reduction in the body weight is in this class of cases frequently beneficial. The daily ration may consist of white meat (chicken or fish) ℥iiiss, one or 2 eggs, some salt-free bread and butter, vegetables, fruits and 1–2 glassfuls of milk. Alcoholic beverages, coffee, meat broths should be forbidden: while alkaline mineral waters and a moderate quantity of weak tea may be given.

Occasionally it is advisable to institute one or two meat-free days weekly and also to prescribe a very small breakfast (½ roll and one cup of weak tea without milk). Provided the quantity of foods taken at the other two meals is not increased, this plan of alimentation will lead to a slight reduction in weight. Wherever the

latter appears desirable, this regime can be applied with advantage.

(*c*) *Congestive nephritis;* (scanty urine of high specific gravity containing a small amount of albumen, without any or but very few casts).

Congestive nephritis is usually due to grave disturbances of the heart leading to diminished pressure in the renal arteries and increased pressure in the corresponding veins. The treatment must be directed toward improving the general circulatory system and the diet will be that adapted for the special heart lesion.

The main principle is to select a diet suitable for rest of the kidneys—as little protein as possible, no irritating substances, a small amount of fluid. Karell's diet is here appropriate for about 3–5 days. Later, especially if the condition improves, the diet is gradually and cautiously increased.

3. **Complications.** —(*a*) *Uremia.*—The diminution of the excretory function of the kidney leads—if pronounced, already at the beginning of the disease, otherwise in the later stages—to uremia. The latter manifests itself when present in a minor degree, by slight headaches, nausea sometimes accompanied by vomiting

and general unneasiness. When the excretory function is lacking in a higher degree, it leads to loss of consciousness and also convulsions. The arterial blood pressure—usually high in nephritics—frequently shows a further increase; although in rare instances the reverse takes place (bad prognosis).

The diet will consist of milk and gruels and fruit juices, 5 to 7 ounces every 2–3 hours. When vomiting exists or when loss of consciousness be present, rectal alimentation must be resorted to. Notwithstanding the existence of edema, a 5–6% glucose solution can be given by the Murphy Drip through the rectum in quantities of one to two quarts daily. By this means it is occasionally possible to stimulate the kidneys to better work, in such a manner that the obnoxious substances are ultimately removed, —leading to a return of consciousness. As soon as patient is able to take food, the same diet is employed as in acute nephritis. Provided there is a further improvement alimentation is gradually increased and the rules laid down in chronic kidney disease observed.

(*b*) *Dropsy* (general edematous swelling, anasarca, ascites; pleuritic exudations) frequently

appears in acute nephritis and is almost always encountered at one time or another, during the chronic stage of renal affections. This complication requires special treatment and diet. An exclusive milk diet (1½–2½ quarts daily) is frequently found beneficial, the urine becoming more abundant, showing less albumen, and the swellings gradually disappearing. The general nutrition, however, cannot improve on this insufficient alimentation. For this reason this regime, while useful for a short period of time, cannot be employed indefinitely.

Widal and Strauss have conclusively shown that chloride of sodium retention which is frequently met with in nephritis leads to edema. This discovery gave origin to a new mode of diet appropriate for these cases, namely the salt-free diet. Restriction of fluids and of chloride of sodium is most important. The diet consists of bread, milk, eggs, arrowroot, rice, vegetables; everything prepared without salt. Fish, poultry or meat may be added, and milk (if not desired) entirely omitted from the bill-of-fare. The quantity of meat should however, not exceed ¼ of a pound a day. Fruits should be given in considerable quantities, while spices

and meat soups, likewise alcoholic beverages, should be entirely forbidden. The salt-free diet regime has been generally accepted and is employed with great benefit.

Another mode of dietary regime for dropsy has been suggested by Kakowski.[1] This eminent clinician gives his patients 3–5 pounds of squash daily divided into 3 portions, prepared with milk or cream or rice soup and butter. The squash is prepared as follows:

Raw squash, in quantities of 3–5 pounds, is cut into small pieces and placed into a pot, a small quantity of water, enough to cover the bottom, is added and the whole mass stirred. The pot is now left boiling over a low fire for two hours, and the contents are frequently stirred. The squash mush is then mixed with some butter and milk-soup (usually rice soup) and is ready for use. Instead of water the squash may be prepared with cream, which gives it a better flavor and makes it more nutritious.

Kakowski had excellent results from this exclusive squash regime. He considers the squash as the best natural diuretic, increasing

[1] A. Kakowski: "Die Kürbisbehandlung der Ödeme." Zeitschr. f. phys. und diätetische Therapie, Juni and Juli, 1914, Bd. xviii, h. 6, 7.

the secretory function of the kidney without having any slight irritative effect on this organ.

In conjunction with Dr. N. Stadtmüller I have employed squash and also musk melons, watermelons and cucumbers in cases of dropsy. While we did not see as striking results as described by Kakowski, we, nevertheless, had the impression that this group of fruits (cucurbitæ) acts beneficially on the kidney function and deserves recommendation. The squash we gave as prescribed by Kakowski. Musk and watermelons, we employed raw (about 2 pounds daily), taken in conjunction with a salt-free diet. The cucumbers were given as a vegetable, boiled in milk, about a pound daily, also in conjunction with a salt-free diet.

Squash, melons and cucumbers may be administered with advantage not only in cases of dropsy, but in all instances of kidney derangement. The beneficial action of the cucurbitaceæ may be explained by their richness in potassium salts while containing but little chloride of sodium, and also by their mild aperient qualities.

LECTURE XII

DIET REGIMES

In my previous lectures I have given the principles of diet in health and disease. Based upon them every physician will be enabled to arrange a diet suitable to the requirement of each case. In the following, however, I thought it best to describe briefly several important standard diet regimes, which can be used to advantage for shorter or longer periods of time in appropriate cases but never indefinitely.

SUPERALIMENTATION REGIME

Breakfast, 7:30–8 A. M.: Oatmeal with butter, or farina with cream, 2 eggs, bread (1–2 rolls) and butter, one cup of coffee (half milk) with sugar.

10:30: One cupful of milk with one raw egg beaten up in it; bread and butter.

Luncheon, 12:30–1: One cup of bouillon with one egg, 1–2 rolls, butter, tender meat, mashed or baked potato; weak tea (half milk) with sugar.

3:30: Same as 10:30 A. M.

Dinner, 6:30–7: Cream soup; fish; tender meat, potato, peas or beans; bread and butter, stewed fruit; small cup of coffee.

9:30: Kumyss and crackers and butter.

The quantity of butter to be used daily should be about a quarter of a pound.

This superalimentary regime can be kept up for a long period of time and is suitable in conditions in which a building up of the system is required.

(*a*) **PROTEID—FAT REGIME**

Breakfast: One cup of tea (no sugar, no milk), one egg with butter, one portion of ham, or bacon.

Dinner: One cup of bouillon (℥vii), 200 gm. (℥vii) meat or fish broiled, 2 eggs, hard boiled, lettuce, spinach or asparagus, one cup of tea.

Supper: Fried eggs (3) and bacon, or fried fish with hard boiled eggs or a portion of cold meat, 150 gm.(℥v).

This diet is suitable for diabetes mellitus and for reducing corpulency. Elderly persons and patients with heart and kidney lesions do not bear well this rigorous regime. It is then necessary to add some more vegetables (green peas, beans) and a small quantity of milk or cream to the above bill of fare.

(*b*) **Banting's Regime.**—Breakfast: Meat (beef, mutton, kidneys, fish or ham), 120–150 gm. (℥iv–v); one big cup of tea (without milk or sugar); zwieback or toasted bread (without butter), 30 gm. (℥ii).

Dinner: Fish (excepting salmon) or meat (excepting pork), 150–180 gm. (℥v–vi); vegetables (excepting potato); toasted bread, 30 gm. (℥i); (red wine or Madeira, 2–3 glassfuls permissible; champagne or ale forbidden).

During the afternoon: Fruit, 60–90 gm. (℥ii–iii); 1–2 zwieback; one cup of tea without milk or sugar.

Supper: Meat or fish, 90–120 gm. (℥iii–iv); grog without sugar or 1–2 glassfuls of claret.

Notwithstanding the apparent great amount of foods this bill of fare contains, it furnishes but 1100 calories per day. The Banting regime is used principally as an anti-fat diet. A great many patients, however, cannot stand it and frequently collapse after using it a few days.

Ebstein improved the Banting regime and modified it as follows:

(*c*) **Ebstein-Banting Regime.**—Breakfast: Tea, one cup, without milk or sugar; bread, 50 gm. (℥i⅔), plenty of butter.

Dinner: Soup, one plate; meat, 120–180 gm. (℥iv–vi) fried or boiled with rich gravy; beans, peas and cabbage; (no potatoes, no beets); salad; raw or baked fruit without sugar; mild white wine, 1–2 glassfuls.

In the afternoon same as at breakfast.

Supper: One cup of tea without sugar or milk; one egg; fried meat or ham, smoked fish; bread about 30 gm.

(℥i) well buttered; a small portion of cheese, and fresh fruit.

(*d*) **Oertel-Banting Regime.**—Breakfast: Wheaten, bread, 30 gm. (℥i); coffee, 120 gm. (℥iv), with milk, 30 gm. (℥i); sugar, 5 gm. (3i); 2 soft-boiled eggs (90 gm. or ℥iii).

At 11 A. M.: Wine, bouillon, or water, 100 gm. (℥iiiss); cold meat, 50 gm. (℥i⅔); rye bread, 20 gm. (℥⅔).

Dinner: Wine, 250 gm. (℥viii⅓); fried beef, 150 gm. (℥v); salad, 50 gm. (℥i⅔); pudding, 100 gm. (℥iii⅓); bread, 30 gm. (℥i); fruit, 100 gm. (℥iii⅓).

4 P. M.: Coffee, 120 gm. (℥iv); milk, 30 gm. (℥i); sugar, 5 gm. (3i).

Supper: Wine or water, 250 gm. (℥viii⅓); caviar, 12 gm. (3iii); venison, 150 gm. (℥v); cheese, 15 gm. (℥ss); rye bread, 20 gm. (3v); fruit, 100 gm. (℥iii⅓).

VEGETARIAN DIET REGIME

(*a*) **Schroth's Dry Diet.**—Patient is allowed to eat dry well-baked rolls, 2–3 days old. At noon-time he takes a soup, made out of water, rice, farina or broken up rolls with the addition of some butter or salt. As a drink patient is given oatmeal gruel and is told to sip it slowly, when real thirsty.

This diet is maintained for the first week. During the second week a glassful of wine mixed with half a glassful of water and some sugar is given warm in the afternoon, while the rest of the diet remains unchanged.

During the third week patient lives on the same diet, but leaves off the wine every alternate day.

Schroth's diet may be advantageously used in edematous swellings and ascites, also in arteriosclerosis, omitting the wine, however, for a period of 5 days or a week. Being a diet much deficient in calories and nutritive material it must be employed with great care and for short periods of time only.

Very similar to Schroth's diet is

(*b*) **Bulkley's Rice, Bread, Butter and Water Regime.**[1]—The patient lives exclusively on rice, bread, butter and water.

The rice should be thoroughly cooked with water (not with milk). Generally it is better to have it dried out somewhat, so as to be flaky, by leaving it uncovered on the fire for a while. The rice is freshly prepared with abundance of butter and salt. It should be eaten slowly with a fork and be perfectly masticated. The bread and butter should also be well-chewed, to secure the full action of the saliva. Water, hot or cold, but not iced, is to be taken freely, but not to wash down the food in the mouth.

This diet should be kept up for 5 days, when an ordinary mixed diet is resumed.

[1] L. D. Bulkley: Personal Experience with a Very Restricted Diet (Rice) in Acute Inflammatory Diseases of the Skin. Med. Record, Jan., 28, 1911. Also Bulkley, "Diet and Hygiene in Diseases of the Skin," Hoeber, N. Y., 1913.

This rice, bread, butter, and water diet is useful in acute inflammatory conditions of the skin like eczema, erythema, and principally itching.

(*c*) **Hoffmann's Regime.**[1]—Hoffmann's regime is a coarse vegetable diet consisting of brown bread, Graham bread, butter, potatoes, and all kinds of vegetables containing much cellulose, principally cabbage; beets, beans, mushrooms, salads; peas, lentils (not puréed); plenty of fruits.

Hoffmann's regime is best adapted for obstinate neuralgias of unknown origin and for obesity accompanied with constipation. It may be kept up for a period of two weeks. Then it must be changed into a diet of greater nutritive value.

MILK REGIME

Milk is a complete nourishment and may be given up to 3–4 quarts daily. The patient will best take about a pint of milk every 2 hours.

This diet is indicated in irritative conditions of the digestive tract (ulcus ventriculi; chron. enteritis; cirrhosis hepatis, and in affections of the kidneys).

[1] A. Hoffmann: Leyden's Handbuch der Ernährungstherapie, Bd. i, p. 568; Leipzig, 1896.

Karell[1] highly recommended the milk diet. He gave during the first week 200 cc. (℥vii) of skimmed milk four times daily. If there were no bowel disturbances he increased the quantity during the second week to one quart and a half daily.

Karell's scanty milk diet is useful in severe neuralgias, in affections of the heart and kidneys accompanied with edematous swellings or ascites.

SOUP DIET

Soup diet or liquid diet consists of mixtures of nourishment given in fluid form. This is the standard diet for all acute febrile diseases, and for chronic conditions for periods of time. It can be varied according to the requirement of the case. Eight to 10 ounces of gruels (oatmeal,—barley,—rice or pea—or lentil-flour) alone or mixed with half milk every 2 hours can be employed in most instances. When it is necessary to supply a sufficient nutrition, raw eggs, lactose, or butter may be added and should be thoroughly mixed with the above foods. Thus 1–2 eggs may be mixed in a cupful of milk, or gruel, or bouillon; or lactose ℥ss–℥i, or butter ℥iii added to milk or gruels with or without egg. Instead of milk, kumyss or zoolak or buttermilk may be given for a change. Clambroth and oyster-stew in milk, without

[1] Karell: Arch. génerales, 1866.

the oysters, further enlarge the bill of fare. Milk, flavored with tea, cocoa, or coffee; lemonade, orangeade, are also useful in increasing the variety of the monotonous diet.

FLUID DIET WITHOUT NUTRITIVE VALUE

Breakfast, 8 A. M.: Tea or coffee, 1–2 cups, 250–500 cc.
Lunch, 12: Bouillon 1–2 cups, 250–500 cc.
4 P. M.: Tea or coffee, 1–2 cups.
Supper, 8 P. M.: Bouillon, 1–2 cups.

Two quarts of plain water or Apollinaris or Vichy should be consumed in addition in every 24 hours.

FLUID DIET WITH LOW NUTRITIVE VALUE

	Calories
8 A. M.: Tea or coffee, 250–500 with one teaspoonful of sugar.....	16
Lunch, 12: Thin barley gruel (one tablespoonful) 300 cc.....	50
4 P. M.: Bouillon, 250–500 c.c.	
8 P. M.: Lemonade, 250–500 cc. with one tablespoonful of sugar.....	60
	126

Two quarts of plain water or Apollinaris or Vichy should be consumed in addition in every 24 hours.

MEDIUM FLUID DIET (HALF RATION)

		Calories
8 A. M.:	Milk, 300 c.c.	202
10 A. M.:	Milk and strained barley water (aa) 300 c.c.	160
12 noon:	Bouillon 300 cc. with the white of 2 eggs	30
2 P. M.:	Lemonade 300 cc., with 2 tablespoonfuls of sugar	120
4 P. M.:	Milk, 300 cc	202
6 P. M.:	Same as 12	30
8 P. M.:	Whey, 300 cc	60
10 P. M.:	Same as 2 P. M	120
		924

One quart of water should be taken in addition in 24 hours.

FULL FLUID DIET (FULL RATION)

		Calories
8 A. M.:	Milk (200 cc.) with coffee (100 cc.) and sugar 2 teaspoonfuls	160
10 A. M.:	Bouillon and one egg	82
12 A. M.:	Milk (200 cc.), cream (50 cc.) and cereal (50 c.c.)	426
2 P. M.:	Same as 8 A. M	160
4 P. M.:	Milk (250), cream (50)	206
6 P. M.:	Milk (200) tea (50), cream (50), sugar 2 teaspoonfuls	328
8 P. M.:	Milk (200), cream (50), cereal (50)	426
10 P. M.;	Milk (300)	192
		2,070

DIET FOR CONVALESCENTS

Breakfast, 8 A. M.: Soft boiled or poached eggs (2); toast and butter, coffee with milk and sugar.

10:30 A. M.: Egg nog; crackers and butter.

Lunch, 12:30 P. M.: Cream soup or meat soup; white bread and butter; tender meat; mashed or baked potatoes; spinach or cauliflower; custard or tapioca pudding.

3:30 P. M.: Egg nog; crackers and butter.

6:30 P. M.: Fish, or oysters; scrambled eggs or an omelette; toast and butter; rice or tapioca pudding; cup of weak tea with sugar and milk.

9:30 P. M.: One glassful of milk or kumyss and crackers and butter.

PURIN-FREE DIET[1]

Breakfast: Fruit (apple, banana, pear, grapefruit or orange); cereal (oatmeal or farina) with cream or butter; one egg; bread and butter; milk.

Dinner: 1–2 eggs; mashed or baked potatoes with butter; green vegetables (string beans, cauliflower, Brussels sprouts), rice or spaghetti; baked apple; milk.

Supper: Cereal (rice or oatmeal or farina) with butter; cheese, bread and butter; stewed fruits; tapioca or rice; milk.

[1] This diet is useful for short intervals of time in high blood pressure.

DIET FOR INTESTINAL PUTREFACTION

Breakfast:	Fruit: apple, banana, pear, grapefruit, orange Cereal: oatmeal, farina, shredded wheat, with milk or cream Bread and butter Tea
Dinner:	Soup: vegetable 2 eggs: soft boiled, scrambled Potatoes: rice or spaghetti Baked apple Coffee with milk
Supper:	Rice and milk Cereal: oatmeal, farina, shredded wheat, with butter Cheese Bread and butter Stewed fruits

VEGETABLE MILK DIET

Vegetable milk, as recommended by Fischer[1], is obtained from sweet almonds or Para-nuts, in the following manner. Half a pound of sweet almonds or Para-nuts (freed from the shell and skin) are grated, then pounded in a mortar with a piston under the addition of small quantities of cold water until the amount reaches one quart. Rub the mixture thoroughly until there is a perfect emulsion. Put the mixture on ice for 2 hours, then strain over a cheese cloth. It

[1] A. Fischer: Arch. f. Verdauungskrankh., Bd. xx, h. 2.

TABLE SHOWING THE NUTRITIVE VALUE OF VEGETABLE MILK AND COW'S MILK ALSO CREAM

	Nitrogenous substances	Fat	Carbohydrate	Water	Ash	Chloride	Purin bodies	Total dry substance	Fat free dry substance	Ca ories	Specific gravity at 15°C.	Reaction
Almond milk	3.31	8.10	1.0633	87.03	0.49	0.0067	.....	12.97	4.87	91	1.0098	Alkaline
Para nut milk	2.88	10.70	0.7916	85.10	0.52	0.0084	.....	14.90	4.20	114	1.0037	Alkaline
Cow's milk	3.2	3.4	4.7	87.8	0.7	0.175	.....	12.20	....	64	1.028–34	Amphoteric
Cream	4.12	23.80	3.92	67.61	0.5	0.13	.....	.....	....	244		

should be used freshly prepared and kept on ice. Every day a fresh supply must be made.

The above table shows that the vegetable milk contains about as much albumen as cow's milk, but is richer in fat and poorer in carbohydrates. It also contains less chlorides than cow's milk. These qualities make the vegetable milk a valuable element in gastric hyperacidity and in kidney and heart lesions. It can be given in quantities of one quart to one and one half quarts daily, in addition to other foods, or alone up to three quarts in 24 hours.

DIETS FOR PATIENTS ENTERING THE HOSPITAL

With regard to diet we can divide patients entering a hospital into the following groups: (1) patients without fever

suffering from constitutional, nervous, and skin lesions requiring, medical aid and likewise patients without fever with some special affections outside of the digestive tract, as for instance, tumors of the knee, dermoid cysts, lipomata, etc., needing surgical help; (2) patients without fever suffering from the digestive tract; (3) medical or surgical; cases accompanied by fever.

In group 1 a full diet can be given.

In group 2 a soft diet is best.

In group 3 a liquid diet should be instituted.

In the following I give the 3 forms of diet: (1) full diet; (2)Soft diet, (3) fluid diet, as used in the Lenox Hill Hospital, New York, which are very appropriate for patients entering the hospital, as preliminary modes of nutrition.

DIETARY FOR PATIENTS ENTERING HOSPITALS

	Breakfast	Second breakfast	Dinner	Supper
Form I Full diet....	Bread, 4 oz. Coffee with milk, ¾ pt. Sugar, ½ oz. Butter, ½ oz. Oatmeal or farina or force, 4 oz. Eggs, soft boiled	Milk, ¾ pt. Zwieback, 2 or or crackers, 3 Butter	Soup, ½ pt. Meat, 5 oz. Potatoes, 6 oz. Vegetables, 4 oz. on Sunday Tuesday Wednesday Thursday Saturday Pudding or stewed fruit on Friday also fish	Cold meat, 4 oz. Bread, 4 oz. Butter, ½ oz. Tea with milk ¾ pt. Stewed fruit on certain days Eggs instead of meat
Form II Soft diet....	Oatmeal or farina or rice with milk, 10 oz. Coffee or cocoa with milk, ½ pt. Crackers, 1 oz. Butter, ½ oz.	Milk, ¾ pt. Zwieback, 2 Crackers, 3 Butter	Eggs, soft boiled, 3 Soup with farina, rice or hominy, ½ pt. Crackers Butter Afternoon Lunch Milk, ¾ pt. Zwieback, 2 Crackers, 3	Eggs, soft boiled, 3 Rice with milk, ½ pt. Crackers, 3 Butter, ½ oz. Fruit jelly
Form III Fluid diet...	Milk, or coffee, or cocoa with milk, ¾ pt. Eggs, raw, 1	Milk, ¾ pt. Zwieback, 2 or crackers, 2	Beef tea, or gruel broth, ¾ pt. Eggs, raw, 1	Milk or tea, or cocoa with milk, ¾ pt. Eggs, raw, 1

LECTURE XIII

THE DIET IN OPERATIVE CASES

Before any operation is undertaken the question arises whether the body is in a fit condition to stand the operation. In high degrees of subnutrition and inanition it is sometimes better to delay the operation, if feasible, until a better state of general nutrition can be accomplished. If the nature of the disease excludes such a possibility then filling up of the system with water, will be of great assistance.

Any kind of general anesthesia (chloroform or ether) requires some preparatory dietetic regime. Usually it is best to have the patient on a light diet (milk, cereals and light vegetables, a few eggs, very little meat, bread and butter, soups, stewed fruits) the day before the operation. A mild cathartic the night previous to operation is, likewise, appropriate, although not absolutely essential. If the operation is done in the early morning it is best to have the patient in the fasting condition. If later in the day, a light breakfast consisting of tea and toast, is advisable.

When the operation is in the afternoon, then an early luncheon of a cup of bouillon and crackers may also be given.

The reason why no bigger meal is allowed is the tendency to vomit on account of the anesthesia.

Following the anesthesia no food is given until the following day. For thirst small pieces of ice can be kept in mouth, or the latter may be frequently washed with cool plain water or with mineral water. A Murphy drip per rectum of saline or saline with coffee will also be of help.

A day after the operation the diet will depend upon (1) the state of the stomach as influenced by the anesthesia and (2) upon the nature of and the organ on which, the operation was performed.

THE DIET AS INFLUENCED BY THE ANESTHESIA

The effect of the anesthetic remedy upon the stomach varies in different individuals. Some awake and show no ill effects. In such patients the anesthesia as such will hardly influence the dietary regime. In others there is nausea and vomiting extending for a number of days. Here very little of the finest nourishment (egg albumin water, barley water, mutton broth, clam broth, kumyss) will be given every two to three hours

until there is a decided amelioration of the gastric irritability, when more substantial foods can be given. The diet should always be gradually and cautiously changed and never increased too abruptly.

THE DIET AS INFLUENCED BY THE NATURE OF THE OPERATION, AND THE ORGAN THE LATTER INVOLVES

A small operation like the removal of a dermoid cyst or lipoma of the skin will require no dietetic change and patient will be able to eat as usual. A major operation, however, no matter on what organ influences the state of the whole organism inclusive of the digestive tract. There is usually some suffering present, while at times a rise of temperature exists. A light liquid diet will be appropriate for the first 2–4 days. Thereafter semiliquid and solid food can be added.

We will also have to differentiate between operations of organs outside the sphere of the digestive apparatus and those of the alimentary tract.

The operations outside of the digestive tract influence the diet merely in a general way, depending upon the condition of the stomach and the general state of the organism as mentioned above.

The operations on the alimentary tract require special attention with regard to diet. For here the food or its products have to pass over the operated area. The dietary regime will pay attention to favor the healing process as much as possible and to introduce sufficient food when feasible.

In operations upon the esophagus and also the stomach, rectal alimentation and still better duodenal alimentation can be resorted to, if necessary. Provided the patient is in good nutritive condition, he can be left for 2–3 days without food. Small amounts, 1–2 tablespoonfuls, of egg albumen water, alternating with the same quantity of barley or oatmeal or rice water, are given every hour or two during the day, while 1–2 quarts of saline or of a 5 per cent glucose solution are injected daily into the rectum by the Murphy drip.

On the 3rd day of the operation milk and barley water mixed (half and half) is added to the above in the same quantities. On the fourth day instead of one ounce, two ounces are given of the same nutritive material. On the 5th day milk and mutton broth and gruels with milk are given every two hours in three ounce quantities. On

the sixth day 4–5 ounces of the above with the addition of one raw egg in bouillon are given every two hours. Thereafter the diet is further increased by giving every day an addition of one ounce more every two hours and likewise one egg more every day, so that on the 7th day 7 ounces and two eggs, on the 8th day 8 ounces and three eggs, on the 9th day 9 ounces and 4 eggs, and the 10th day 10 ounces and 5 eggs are employed. During these four days the diet is also increased step by step in consistency. Thus, first strained gruels, and strictly raw eggs, beaten up in milk or bouillon are administered; later on farina in the milk, coddled eggs, still later crackers and butter, mashed potatoes are added. On the 11th day, poached eggs on toast are added and chicken with baked potatoes are given at luncheon. Soup with vermicelli, mashed vegetables and stewed fruits are then also employed. From the 12th day on it is well to arrange for three larger meals and two additional smaller meals, the latter to consist of milk or egg nogg and crackers and butter or toast and butter, while the larger meals resemble more the ordinary meals.

Coarse foods (like salads, raw apples, sausages)

will be avoided for a long time, especially after operations upon the gastro-intestinal canal proper.

It is self understood that the increase in the bill of fare will take place, as stated above, merely when the patient shows no ill effect from the diet, otherwise the nutrition can not be increased, and in some instances may have to be decreased for a period of time. As soon as the patient's digestion improves the increase in the diet is again resumed.

In operations upon the colon and the rectum it will be necessary to arrange a diet which contains very little undigestible residue. This serves to diminish the amount of fecal matter, and in this way favor the healing process in the colon. The diet consists of eggs beaten up in bouillon, tender meat, cream, tea with sugar, ice cream; in plastic operations between vagina and the rectum, it is sometimes necessary to keep up artificial constipation for a week or so by instituting the above diet and administering opiates, at the same time. As soon as the healing has taken place, there should be a gradual return to the customary foods.

LECTURE XIV

SUBCUTANEOUS AND RECTAL ALIMENTATIONS

SUBCUTANEOUS ALIMENTATION

By subcutaneous alimentation is understood a method of nutrition by which nutriment is injected under the skin. In this way the alimentation is incorporated into the body without coming into contact with the digestive apparatus. This mode of nutrition has the great advantage that it is feasible with any lesion of the digestive tract, but it has the disadvantage that the alimentation escapes the action of every part of the digestive apparatus. As the entire process of nutrition takes place outside of the digestive tract, all the machinery which the organism possesses for the act of digestion is ignored. It is thus seen at a glance that this mode of nutrition is an unnatural one, and is to be employed only in extreme cases when every other method fails.

Subcutaneous alimentation was first intro-

duced to the profession by Menzel and Perso,[1] who experimentally injected solutions of milk and sugar subcutaneously into animals, and found that absorption took place. The same clinicians have also given oil subcutaneously to patients. Although this method of nutrition has been practiced off and on by Karst, Whitaker, Pick, Carter, and Koll, von Leube[2] must be given credit for having improved and promulgated it. This great clinician noticed that injections of camphor oil were frequently given in various ailments without any detriment to the patient, and that oil could therefore be incorporated into the body subcutaneously without causing any obnoxious consequences. The same substance may therefore be used for nutritive purposes.

The question whether oil can be given in this way in sufficiently large amounts, and also whether it can be utilized by the organism, has been answered in the affirmative by von Leube and his pupils. They also found that,—while proteins, subcutaneously injected, cause

[1] Arthur Menzel and H. Perso: Über die Resorption von Nahrungsmitteln vom Unter-hautzellgewebe aus. Wiener Med. Wochenschr, 1869, p 517.

[2] Von Leube, W.: Über künstliche Ernährungs-therapie. Bd. I, p. 490.

albuminuria, and solutions of sugar in high concentration cause various pains,—olive oil may be injected daily in amounts of 30 to 40 cc. without discomfort to the patient.

In employing this method, strict asepsis must be observed. Pure olive oil or sesame oil, previously sterilized, can be used.

Mode of Procedure.—The part of the body (preferably, the thigh) into which the injection is to be made, is first rubbed off with alcohol and then painted with iodine. A sterile glass syringe of about 15 to 20 cc., to which a thin rubber tube is attached, is connected with a canula having a large lumen. The syringe is filled with the oil at blood temperature, and is then attached to the canula, so that the oil drips out of the canula. The skin is then pierced with the latter, and the oil very slowly injected. Instead of a syringe, a funnel can be used, and the oil made to run in by its own gravity. The oil should never be injected too quickly. It is best to use ten to fifteen minutes for injecting 10 to 15 cc. of oil. On removing the canula, the wound is cleaned off with cotton and closed with iodoform collodion. Three such injections may be given daily.

Inasmuch as fat given as nourishment alone, without protein, increases the decomposition of the nitrogen content of the body, it is advisable when using this method of alimentation to also introduce some protein into the organism by some other way. Subcutaneous alimentation, therefore, will be used principally as a supplementary procedure, in connection with some other method of nutrition.

RECTAL ALIMENTATION

By rectal alimentation is understood the ingestion of nutritive material into the large bowel. Rectal alimentation is the oldest form of artificial (or extra-buccal) nutrition. This method was practiced as early as the middle ages, and the literature on this subject is quite extensive. We need mention only the names of Aetius, Hood, Steinhäuser, Flint, Ewald, Filippi, Albu, Leube, Bodenhamer, Stillman, Tyson, Rost, Aldor, Edsall and Miller, Eustis, Benedict, Adler, Gompertz, Carter, and Goodall.

The nutritive value of this form of alimentation, especially with regard to protein and fat, has been found to be quite small. Beddard[1]

[1] A. P. Beddard: Rectal Feeding. Guy's Hospital, October, 1901, p. 452.

thought that the importance and value of rectal alimentation consisted chiefly in the amount of water introduced into the system. He says: "It is quite sure that more patients die on account of lack of water than from lack of nourishment. In all cases of rectal alimentation in which no water is given by mouth, physiological saline should be subcutaneously injected."

Wernitz[1] likewise laid stress on the importance of introducing more fluid into the body. He was the first to recommend rectal injections of saline by the drip method. He was convinced that by giving it slowly in this way the fluid is better absorbed. In this country, the rectal injection of physiological saline by the drip method has been promulgated by J. B. Murphy, of Chicago. Deucher, Eberhard, Strauss, Boas, and others, have likewise laid stress upon the injection of fluids, and also nutritive material, into the rectum slowly by the drip method.

Method of Administration.—During the period of rectal alimenation, the patient is best kept in bed. Before administering the feeding enema, a cleansing injection (consisting of a quart of

[1] Wernitz, J.: Zur Behandlung der Sepsis. Correspondenzbl. f. Schweizerräzte, 1903, p. 41.

water and a teaspoonful of salt) should be given early in the morning, in order to thoroughly evacuate the bowel. One hour later, the first rectal alimentation may be administered. The feeding enema is best injected by means of a fountain syringe or a Davidson syringe, or a plain hard-rubber piston syringe, and a soft-rubber rectal tube which is introduced into the

Fig. 3—Einhorn's rectal drip tube.

anus for a distance of about five to seven inches. The injection should be administered slowly and without much force. After the withdrawal of the tube from the rectum, the patient is told to lie quietly and to endeavor to retain the enema. The quantity of the feeding enema may be from five to ten ounces. From three to five such enemata may be given daily. All the material should be given at blood temperature.

For the drip injections, it is best to have some warming apparatus for keeping the fluid at body temperature. Inasmuch as the rectal tube for the drip injection must be kept in the rectum for a long while, a very thin non-collapsible rubber

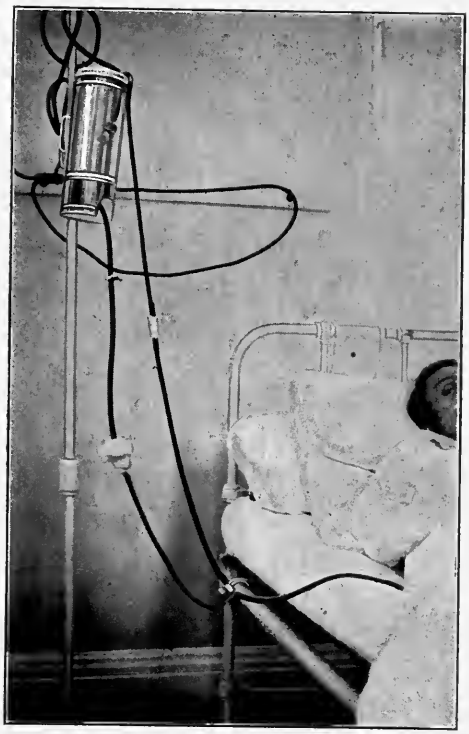

FIG. 4.—Patient is being given saline by the Murphy drip method into the bowel.

tube of 8 to 10 F. (10 m.m. circumference) is recommended for this purpose. At the end of the tube there is a hard-rubber or metal capsule, provided with many openings (Fig. 3). This thin tube does not inconvenience the patient, and the capsule with the numerous openings facilitates the flow of the material.

The following substances may be used as feeding enemata:

(*a*) *Peptone Enema.*—The different kinds of peptones and propeptones in the market (Rudisch's or Kemmerich's or Witte's peptone, somatose, sanose, sanatogen), of which about one to two ounces dissolved in from six to eight ounces of water are to be injected. The different beef juices (Valentine's beef juice, bovinine, Mosquera's beef jelly, etc.) may be dissolved in corresponding quantities.

(*b*) *Milk enema*, 250 to 500 c.c. of milk alone, or milk with the addition of half a gram of bicarbonate of soda.

(*c*) *The Milk and Egg Enemata.*—These are the most commonly used. Their composition is as follows: six to seven ounces of milk, one or two raw eggs well beaten up in it, one teaspoonful of powdered sugar, and one-third of a teaspoonful

of common table salt. Pancreatin (one tube of Fairchild's pancreatin) may be added to such an enema, to facilitate its assimilation.

(*d*) *Meat Pancreas Enema.*—Leube employs enemata consisting of well-chopped meat (five ounces), fresh pancreas (two ounces), one ounce of fat (butter),—all these ingredients being thoroughly mixed with about six ounces of water.

(*e*) *Grape Sugar Enema.*—One ounce of grape sugar in ten ounces of water or physiological salt solution.

Instead of always using one and the same nourishing enema, the above combinations may be alternately administered.

In conjunction with these food enemata, injections of water into the bowel are made in order to increase the amount of fluid in the system. These injections of water for absorption are of great importance. They are retained much better if injected very slowly by the so-called "Murphy Drip Method." Usually saline or 5–6% glucose solution are employed, in quantities varying from a pint to a quart, which may be given twice a day.

The usual procedure is as follows:

7 A. M.: Cleansing enema.
8 A. M.: Egg-milk enema.
12 M.: Drip enema of 5 to 10 per cent grape-sugar solution, 500 cc. or more.
2 P. M.: Egg-milk enema.
6 P. M.: Egg-milk enema.
9 P. M.: Same as at 12 M.

Should the enemas cause diarrhea opium (tinctura opii, 5 drops) is added to the nutritive enema, and plain saline solution is substituted for the grape sugar solution.

LECTURE XV

DUODENAL ALIMENTATION[1]

Duodenal alimentation means feeding a patient through the duodenum in such a manner that the stomach is kept empty. This can be done by introducing a small tube into the the stomach, whence it passes of itself into the duodenum, and is left there. The main purpose of this method is that we should have the patient always ready for feeding, independent of his desire to eat or his aversion to food. It is easily done. The tube can even be allowed to go into the small intestine, depending upon the length of the tube.

I have practiced this method for the last ten years and have treated 500 patients by this method, for periods varying from ten to fifteen days—most of them from fourteen to fifteen days.

The food is usually given every two hours,

[1] Delivered before the Clinical Society of the New York Post-Graduate Medical School and Hospital, March 21, 1913, and published in the Postgraduate, June, 1913.

eight feedings a day. The standard food is milk (7 to 8 ounces), one egg, and a tablespoonful of lactose. The lactose sometimes causes diarrhea and should then be omitted. In some cases where it is essential to see that there is no loss of flesh, butter (1 to 2 drams) and also barley flour may be added in every alternate or in each feeding. This standard diet furnishes 2215 calories. If in addition, one ounce of lactose is given, it brings it up to about 2695 calories for a grown person. If butter is added, it brings it up to 3000 and more calories. Only a few patients cannot stand the milk, the latter creating such a disturbance that it must be eliminated. Such patients tell you that they never could take milk anyway. Here instead of milk, water with barley or pea flour can be substituted or vegetable milk employed. Whatever is fed to the patient must be of blood temperature—neither cold nor hot—strained over a cloth, and it must be given slowly. When I began to feed these patients I made use of an irrigator, letting the fluid run in by gravity which would carry it to the duodenum, but *it was soon found* that this was very inconvenient. The temperature cannot be so well maintained,

and the flow is either too quick or too slow. It was very troublesome, and the patients could not stand it, so a syringe was devised, provided with a three-way stopcock and with a

FIG. 6.—The duodenal feeding apparatus, with table support. A, tube leading to syringe; B, tube leading to duodenal pump; C, crank; D, tube leading to fluid; F, fluid; G, glass; T, table support or shorter support. When crank C is turned parallel to A, fluid can be aspirated from the glass into the syringe. When C is moved parallel to B, the fluid from the syringe can be emptied into the duodenum.

little table (Fig. 6), so that there is no need of loosening the syringe from the tube each time the former has to be filled, and the feeding can be made slow or fast as desired. The patients usually prefer to have it administered slowly,

FIG. 5.—Patient being fed through the duodenal tube.

for if given quickly they feel uncomfortable. It is a very tedious performance, but the patients can soon learn to feed themselves, and it gives them something to occupy themselves with. It requires about twenty minutes or so for each feeding, and that repeated for eight times a day, gives them something to do.

Instead of using the syringe all this time for the injection of the entire amount of nutriment, this can be advantageously arranged after Burkhardt by syphonage. Proceed as follows: Turn crank to A and fill up the syringe, then turn crank to B. and inject about ⅘ of the syringe into the duodenum. Turn crank midway between A. and B. parallel to the tube connecting the table with the nutriment in the container and leave it this way. The fluid after having been primed continues to run steadily by syphonage—should the flow stop, the syringe is filled up again and the process repeated as described.

This way of feeding is more agreeable to the patient and less laborious.

A word in regard to the technical points of this method of alimentation. The tube is put into the throat of the patient and he swallows it with

water. Care must be exercised that the patient does not swallow it too quickly, so that it does not rotate on itself, but will be taken straight into the stomach. Then, a little later, liquid food is given by the mouth and tests are made from time to time through a syringe attached to the tube to see what can be obtained. If the duodenal tube is still in the stomach an acid liquid appears quite quickly by aspiration. If the tube is beyond the pylorus, in the duodenum, it is very difficult to obtain fluid, for the duodenum is usually empty. The secretion appears slowly in drops from time to time and shows an alkaline reaction. Another point of differentiation is that if we should put in air through the syringe, the patient feels it right away if the pump or tube is in the stomach; but if the tube end is in the duodenum there is less conscious sensitiveness and the patient does not feel the air at all. If we have to deal with a patient who has no gastric secretion it is more difficult to determine when the pump has entered the duodenum. Here there is no acid in the stomach anyway, and in order to ascertain whether the pump is in the stomach or duodenum, we make use of different colored fluids. For instance,

Fig. 7.—Patient L. K. with duodenal tube in the duodenum with empty stomach. The *X*-ray photographs (Figs. 7 and 8) were kindly made for me by Dr. W. R. Stewart, Radiologist to the Lenox Hill Hospital.

FIG. 8.—Patient L. K. after the ingestion of a bismuth mixture into the stomach. The end of the duodenal tube is distinctly visible outside of the stomach, in the duodenum.

a patient who has had no milk, but only bouillon or tea, may be given a white (colored) fluid, such as milk. If we then aspirate and obtain a fluid that is not white, we known that the tube end is beyond the stomach. If the patient had milk we give him black coffee, or any colored fluid that is not white.

In normal individuals it usually takes two or three hours for the tube to go through into the duodenum, but in cases where we have to apply this method, we often have to deal with a pyloric spasm, and then it takes much longer. In some cases I have had to wait twenty-four hours, the longest time being forty-eight hours. During the period of the tube passage, patient is fed by the mouth with liquid diet and tests are made from time to time in order to ascertain the location of the tube.

On the other hand, in cases of achylia gastrica, the passage of the tube into the duodenum takes place very quickly. We test it and find it sometimes already after 5 or 10 minutes in the duodenum. The motility is much greater there. Returning again to the method of feeding: The temperature must be just right. The food introduced must be free from thick particles.

All the food should be strained, because in passing through the long fine tube it would easily become blocked if this precaution were not taken. A thin tube is better for the patient. The smaller the tube, the pleasanter for the patient; but, on the other hand, the more difficult the handling of it. Another rule is that after each feeding, after the food has been given, a little fluid should be thrown in and then a little air when the stopcock is closed, in order to keep the tube always empty. If one is not careful to clean out the tube with water and air, the end becomes clogged in a day or two, and the tube has to be taken out and replaced, with a great deal of inconvenience to the patient, as well as to the doctor and nurse, and that tube is often spoiled. Where I have patients under my direct supervision, nothing of that kind happens. It is simply faulty technique when that occurs

Another point is that while the patient has the tube in, his mouth should frequently be washed out with some good mouth wash. If these patients do not eat anything, there is nothing to cleanse off the surface of the tongue, and it is very essential that that should be kept clean.

The tube is left in permanently during the course of this treatment. Outside of the feeding, the patient is given a pint or more of saline twice daily by the duodenal tube. The saline may be given either with the syringe or by connecting an irrigator to the tube. The main point is to let the fluid run in slowly and at the right temperature. If the patient does not like that, it may be given into the rectum by the Murphy drip method, for the bowels absorb saline very well. The food is the vital thing. By this method we accomplish perfect nutrition and everything is utilized.

In my first patients I watched the weight very carefully, and found that in most of them it was possible to keep them from losing weight. Some of them lost, but it was mainly due to a loss of water. They lost no real flesh, for the nitrogen examination showed that under this regimen they were able to add to their nitrogen balance. It is very important to make the patients gain a little weight, but not so necessary as to keep them from losing weight. If we want them to gain, we add a little butter to the regimen.

This method of feeding keeps the stomach empty and so gives it perfect rest. The princi-

ple of rest is a very important factor in curing disease, and this is an ideal method of accomplishing that purpose. A second point is that very often it is essential to accomplish a change in the size of the stomach. If it is greatly dilated, we can keep it empty, and thus give it opportunity to return to its normal size. Still another point along the same line comes up when we have to deal with a dilated esophagus due to cardiospasm. While the usual method of treatment in such cases is the stretching of the cardia, in some instances we find that this alone is not sufficient, and that everything remains in the esophagus. Here we try to keep the esophagus empty. We must have the food on the other side, and the esophagus and stomach are kept empty.

Another point in the same line is that of saving the organ. This method I have recently applied to the treatment of diseases of the liver, with enlargement of that organ, and cirrhosis of the liver. The object is to lessen the inflow of blood to the portal vein. Everything that is taken into the stomach must pass through the veins of the stomach and then through the portal vein before it reaches the general circulation.

The capillaries in the stomach fill up and the veins carry the blood to the liver. The same occurs with the blood from the duodenum, the esophagus, etc. The fluids have to go into the portal vein and then into the liver before they reach the general circulation. If the liver is diseased, it is difficult for it to take up the amount of blood and exert its functions fully. If you reduce part of the inflow, much saving to the liver is accomplished.

In the large number of patients whom I have watched under this method of treatment, the results have been very satisfactory. One of the important advantages of this method is that by it we are independent of the will of the patient. We often have to deal with conditions in which nutrition becomes extremely difficult, extreme anorexia, or aversion to food, etc. In the case of patients suffering from tuberculosis, kidney trouble, and other conditions, it is most important to keep up the nutrition, and by this method the patient can be fed independent of his will. He does not have to eat anything, and he does not reject his food. Some time ago I met a physician, who was quite well advanced in years, who was suffering from chronic nephritis and

who could hardly partake of any food on account of absolute anorexia. I did not feel like suggesting this mode of alimentation to him, but I gave him one of my reprints on the subject. He read it, but did not apply it, and died about two weeks later. If this method of nutrition could have been applied in that instance, his life could doubtless have been prolonged.

This method of treatment is applicable: First, in ulcerations of the stomach and duodenum. Even in perforated gastric ulcer, duodenal alimentation is still at times feasible. Dr. N. de Rosas[1] has applied this mode of treatment in a patient with subphrenic abscess and perforated gastric ulcer. In this patient a laparotomy had been performed and it was noticed that when the patient drank milk it came out through the laparotomy wound. When fed through the duodenum no milk escaped. In two cases of duodenal perforation (fistula) of Dr. Willy Meyer and myself, [2,3]

[1] N. de Rosas: Ulcera del estomago perforada y abceso subfrenico Revista Medica Cubana. December 1916, p. 489.

[2] Max Einhorn: A case of duodenal perforation successfully treated by duodenal (jejunal) alimentation, Med. Record, Nov. 30, 1918.

[3] Max Einhorn: Duodenal perforation (fistula) treated by duodenal (jejunal) alimentation, another case, Journal American Med. Assoc., March, 20, 1920.

duodenal alimentation likewise effected a cure. Second, in a great many cases of dilatation of the stomach without organic obstruction; extreme atony, no matter whether there is a pyloric spasm present or not. (In many instances I have found an actual reduction in the size of the stomach under this treatment.) Third, in cases where nutrition is difficult, nervous vomiting, vomiting of pregnancy, etc. One might at first think it would be impossible to apply this in such cases, for the tube would be vomited, but this is not so.

We at first applied some remedies to make it possible for the tube to remain in the stomach, but as soon as it got into the duodenum or further down, the vomiting ceased, or the patients only vomited something from the stomach; as a rule, they do not reject the tube. In many instances where there was very severe vomiting, this method of alimentation has been the only feasible one. Duodenal alimentation can also be employed in disease of the liver, and in inoperable cancerous conditions of the stomach or cardia, where the stomach is not closed up and the duodenum can be reached.

In such conditions this method can be applied and bring comfort to the patient.

In one instance I could not make the diagnosis, but the patient had pains all the time and could not retain any food. As soon as this method of alimentation was instituted, the pain ceased, and for weeks he was free from pain and was happy. When the tube was removed, he was examined and found to have a malignant disease of the cardia, and later he was operated upon and died shortly after, but during all his illness he was never so comfortable as during the time that he had duodenal alimentation.

LECTURE XVI

INDICATIONS FOR ARTIFICIAL NUTRITION[1]

Artificial or extrabuccal nutrition is frequently resorted to in our medical practice. As is well known, we possess four different methods of artificial nutrition, namely: (1) subcutaneous alimentation; (2) esophagogastral alimentation; (3) duodenal alimentation; (4) rectal alimentation.

It appears of interest to broach the subject of artificial nutrition with regard to its indications and also the special methods best suited.

With this object in view, cases in which artificial nutrition may be required can be divided into three groups:

1. Cases of subnutrition in which the digestive canal presents no obstacles to the passage of food.

2. Cases of difficult or impossible nutrition caused by obstacles to the passage of food along the digestive tube.

3. Cases in which absolute rest of certain portions of the digestive tract is imperative in order to effect a cure.

[1] American Journal of the Medical Sciences, February, 1915, p. 165.

It will be best to discuss the above subject in each group separately.

Group 1. Subnutrition with a Free Food Passage along the Digestive Canal. —Subnutrition can be observed in almost all acute and most chronic diseases. Ordinarily, however, the physician, by rational instructions and an appropriate selection of foods, succeeds in introducing by the usual way (per os) an amount of aliment sufficient for the special case.

In rare cases the introduction of an adequate amount of food becomes difficult—if not entirely impossible—by a pronounced lack of appetite or marked aversion for food. But even then the usual mode of nutrition is persisted in, provided the difficulty of food ingestion is merely temporary, *i.e.*, lasts a few days. So soon, however, as the insufficient nutrition is protracted, and attempts to overcome it by the diverse means at our disposal fail, the necessity of artificial nutrition makes itself felt. In complete abstinence from food artificial nutrition will be the more demanded.

As a whole, total food abstinence is met with principally in the insane and melancholics, also in several severe affections of the central nervous

system, while insufficient nutrition is found in chronic diseases of the most various types.

With regard to the selection of the special kind of artificial nutrition in this group, the esophagogastral method will be selected. For the aliment is undoubtedly best utilized when subjected to the work of the entire digestive apparatus.

In case the repeated insertion of the stomach-tube is especially annoying to the patient, the duodenal tube may be used instead, provided the patient is not rebellious to treatment. In this instance the capsule at the end of the tube should best be made of gold, platinum, or hard rubber. The same method as that of duodenal feeding is applied with the difference that here the end of the tube with the capsule may remain in the stomach. The length of the tube in the digestive canal from the lips should be about 54 cm. The duodenal tube is, therefore, fastened in such a manner that mark II is situated outside the mouth. The thin tube does not molest the patient and is left in the digestive tract for about two weeks.

The food substances here used are, likewise, identical with those in duodenal alimentation,

with the difference that larger quantities may be injected at each feeding.

Whereas in absolute food abstinence the total quantity of aliment is given through the tube, in insufficient nutrition one proceeds somewhat differently. As much food as possible is administered by the mouth, and what is still lacking is given by the tube. As soon as the patient ingests a sufficient amount of aliment by the mouth, artificial nutrition is stopped.

Group 2. Difficult or Impossible Nutrition Caused by Obstacles to the Passage of Food along the Digestive Tube. —This group represents the largest number of cases in which artificial nutrition is employed. It may be advantageously split into two subdivisions: (*a*) Organic stenosis of a high degree (including malignant stricture even of a minor degree); (*b*) medium-sized benign organic stenoses and spastic strictures.

(*a*) Difficulty in the passage of food caused by marked stenoses of the esophagus, cardia, pylorus, duodenum, or small intestine demands *rectal alimentation.* The same obtains if the difficult passage along the above localities is caused by pronounced obstacles compressing the

digestive tube from without or by malignant stenoses of any degree.

Similar stenoses along the colon require *subcutaneous alimentation.*

In all these cases artificial nutrition is but a temporary adjuvant and the stricture requires separate treatment, whenever possible. Thus in benign stenoses, when feasible, stretching should be performed; in malignant strictures, or in benign stenoses either not yielding or not accessible to stretching, likewise in tumors pressing from without an operation for the radical removal of the trouble should be undertaken.

In case the latter is impossible one must be satisfied with the surgical reëstablishment of a food passage, making nutrition possible. Thus in obstacles along the esophagus and cardia a gastric fistula, in those of the pylorus and duodenum a gastro-enterostomy, in those of the small intestine and colon—according to the location of the obstacle—an entero-enterostomy or enterocolostomy, or colocolostomy, or ultimately an *anus præter-naturalis* should be established.

In case an operation for some reason or other is unfeasible, artificial nutrition will naturally have to be carried on as long as life persists.

In these instances subcutaneous and rectal alimentation can be to advantage conjointly employed, or, if necessary, used alternately.

(*b*) *Medium-sized Benign Organic Stenoses and Spastic Strictures of the Digestive Tract.*—In obstacles to the food passage due either to benign organic stenoses of a moderate degree or to spastic conditions—the selection of the special mode of nutrition will depend upon the location of the difficulty.

In spastic states of the esophagus and cardia—provided they are of such a high degree that the usual mode of nutrition be entirely impossible—and in moderate-sized stenoses of the same regions, gastral nutrition by means of a somewhat thin stomach-tube will be employed. In moderate benign strictures of the pylorus, or duodenum or in spasm of the pylorus, duodenal alimentation will be resorted to. If the latter for some reason or other fails, rectal alimentation will be used instead.

Stenoses of the small intestine—interfering with the prochoresis to such a degree that complications endangering life begin to appear—require rectal alimentation. If the affected

area is situated in the colon, subcutaneous alimentation should be instituted.

In the whole subdivison (*b*) the separate treatment of the principal lesion should, likewise, never be lost sight of. The artificial nutrition is but a temporary adjuvant, and should be employed until the obstacles—if this be possible—have been removed or the natural mode of nutrition reëstablished.

Group 3. Absolute Rest of Certain Portions of the Digestive Tract is Important in Order to Effect a Cure.—In this entire group the ordinary way of nutrition, while at times somewhat impaired, is, however, always possible. The extrabuccal alimentation is here employed as a means of curing or ameliorating diseased states.

This group may be suitably divided into two parts: (*a*) diseased states of the digestive tract proper (exclusive of stenoses); (*b*) diseased states of other organs situated without the digestive canal.

(*a*) *Diseased States of the Digestive Tract Proper* (*Exclusive of Stenoses*).—Severe inflammatory processes, injuries, and ulcerations of the digestive apparatus often demand perfect

rest of the affected part in order to achieve complete recovery. This, however, is possible only then when the food contact is entirely removed from the diseased area.

If the lesions just named involve the mouth, pharynx, or esophagus, gastral alimentation by means of a stomach-tube or a thin tube *à demeure* will be resorted to.

In case the seat of the lesion is located in the stomach or duodenum, duodenal alimentation will be employed. It is self-understood that in affections of the duodenum the capsule end of the tube will have to lodge about 5 to 10 cm. or still more below the diseased part. In fresh hemorrhages of the esophagus, stomach, or duodenum rectal alimentation is best administered during the first two or three days, and then duodenal alimentation instituted. Ulcers of the stomach and duodenum have been particularly benefitted by this mode of treatment. Besides in the affections just mentioned duodenal alimentation can be employed to great advantage in the following conditions: dilatation of the stomach (due to weakened musculature) and severe neuroses accompanied by persistent vomiting.

In case the above lesions (described at the

beginning of this group) are situated in the small intestine, rectal alimentation is employed, if needed—and if located in the colon—subcutaneous alimentation. It is self-understood, however that in the last-named instances artificial nutrition will be resorted to merely as an extreme measure, for neither rectal nor subcutaneous alimentation, nor the two combined, are able to supply adequate nutrition to the organism.

(*b*) *Diseased States of Other Organs Situated Without the Digestive Canal.*—At first sight it appears rather strange that artificial nutrition should be indicated in diseases of organs not participating directly in the act of digestion. If we consider, however, what intimate relations exist between the digestive apparatus and the organs of circulation as well as of elimination—with each ingestion of food there is an overflooding of the circulation with new material and as a consequence an augmented activity in the circulatory and eliminative systems—it is plausible that leniency toward the digestive tract will exert a beneficial influence on other remote organs.

In fact it has been long known that a scanty insufficient nutrition, as, for instance, "Karell's

diet," applied for a short period, is of distinct benefit in disturbed compensation of the heart.

Occasionally the ingestion of the smallest amount of food into the stomach produces an irritative state of the neighboring organ, the heart, especially if the latter is badly diseased. In such instances artificial nutrition (rectal or duodenal alimentation) may be indicated.

In two cases of severe myocarditis causing stenocardia in a high degree—and in which the minutest quantity of food given by mouth brought on attacks of severest dyspnea greatly endangering life—I have seen duodenal alimentation applied without the slightest inconvenience to the patient. This mode of nutrition greatly alleviated the condition of the two patients and prolonged their life.

There is, therefore, an indication for artificial nutrition in severe affections of the heart in which the ordinary mode of alimentation is accompanied by severe dangerous symptoms. Rectal or, still better, duodenal feeding will then be used.

Diseases of the liver occasionally require a course of artificial nutrition (rectal or, still better, duodenal alimentation), in order to

relieve somewhat the functions of this important organ. In several cases of cirrhosis of the liver[1] I have observed the greatly beneficial influence of duodenal alimentation on this disease.

[1] Max Einhorn: On the Beneficial Effect of Duodenal Alimentation in Cirrhosis of the Liver, Medical Record, July 26, 1913.

LECTURE XVII

PREPARATION OF FOOD FOR INVALIDS (THE DIET KITCHEN)

A few directions regarding the preparation of food for the sick appear to be appropriate. The changes brought on artificially in raw food material have the following objects in view: (1) cleanliness and asepsis; (2) increasing the digestibility; (3) removal of indigestible or inappropriate material; (4) preserving or diminishing some of the ingredients contained in the foods. All these aims are accomplished by mechanical, thermic, and chemical measures (washing, peeling, pounding, boiling, steaming, broiling, frying, etc.), which are well known to every person accustomed to the kitchen management for every day life. For the sick the same principles prevail. They must, however, be applied with greater precision, and with due regard to the special case. A new feature here is the proper mixing of the food so that the nutritive value is enhanced, without much change in the bulk of the aliment.

In the following a short description of the preparation of foods commonly used in the diet of the sick will be given. Simplicity, cleanliness, and attractiveness must form the basis of each dish furnished to the patient.

1. **Egg Albumen Water.**—The white of one raw egg is well beaten with about 100 cc. (6½ to 7 tablespoonfuls) of cool water, strained over a piece of cheese cloth and seasoned either with a trace of common table salt or some sugar.

2. **Gruels or Decoctions of Cereals.**—A heaping tablespoonful of washed, prepared or pearl barley (rice, arrowroot, or oatmeal) is put into a saucepan and a quart of boiling water and a pinch of salt added. Stir and boil until it has evaporated to about ⅔ of a quart, then strain through fine cheese cloth. It can be flavored with lemon rind while boiling.

3. **Almond Milk.**—Thirty grams. (℥i) of sweet almonds and 2 bitter almonds are left in cold water over night and peeled. The almonds are then pounded thoroughly in a mortar and mixed up with half a pint of warm water or warm milk. The mixture is left standing for 2 hours, strained and pressed out well through a piece of cheese cloth.

4. **Meat Juice** (After Wiel).—Fat-free meat is cut into cubes of ½ inch each, wrapped in coarse linen and subjected to the work of a press machine. The juice can be given as it is or mixed with tepid bouillon. Valentine's beef juice is a good ready preparation of meat juice and can be used instead of the fresh product, if more convenient.

5. **Beef Juice** (After Cautley).—(*a*) Cut up some rump steak or undercut of the sirloin of beef into pieces which will fit into a lemon squeezer. It is better to use a proper meat press. Broil the meat rapidly on a hot fire or in a frying pan, on both sides, to keep in the juice. Forcibly express the juice with slow pressure. Season with salt and other condiments if necessary, and give it warm, in a colored glass or mixed with other foods.

(*b*) Chop up finely or scrape with a fork or meat scraper to separate the connective tissue, lean beef and put it in a jar or cup, with a pinch of salt and enough cold water to cover it. Allow it to stand from one to six hours and then squeeze well through coarse muslin. It may be given alone or mixed with other foods, warm or cold,

but not hot. It should be warmed by heating in a double boiler.

6. **Beef-tea.**—Half a pound of fat-free meat is cut into small cubes and put into a fruit jar or flask with wide opening and closed. Place the vessel into warm water and parboil for about half an hour. Pour off the juice which is ready for use.

7. **Meat Broth or Bouillon.**—One pound of lean meat is cut into small pieces and put into a pot containing about 3 quarts of cold water. The pot is well covered and heated to boiling then kept boiling for 3–4 hours. A few bones and vegetable herbs may be added before boiling to give the broth a better taste. The broth is poured off and used clear without the meat.

8. **Soups with Cereals.**—Knorr's barley, or oatmeal, or pea flour is stirred up first with cold bouillon to a thin mass, then poured into boiling meat broth and left boiling for 1–2 hours. About one tablespoonful of the flour is enough for one plate of soup. Before serving the yolk of one raw egg may be added to the soup, which increases the nutritive value.

9. **Kumyss.**—Dissolve ¼ of a Fleischmann yeast cake in about a tablespoonful of luke-

warm water by stirring. Pour this into a quart of lukewarm milk, add 1½ tablespoonfuls of sugar, and shake thoroughly. Then fill bottles with this mixture and close them airtight. Keep them for six hours in a warm room; then put them on ice, and serve the following day.

10. **Junket.**—Heat half a pint of milk in a can to body temperature, add 1–2 teaspoonfuls of essence of pepsin or ¼ junket tablet and stir gently; then let the can stand in a bowl with warm water for about ½ an hour, when the milk curdles. Serve with sugar and nutmeg.

11. **Whey.**—Curdle milk in the same manner as in preparing junket, then strain through a cheese cloth. Serve cool.

12. **Milk Punch.**—Two-thirds of a glassful of milk; one to 2 teaspoonfuls of sugar, one raw egg; one tablespoonful of sherry or a ½ tablespoonful of brandy; nutmeg.

Separate egg and beat the yolk until very light with sugar, add the white, beaten stiff, then the brandy and the milk. Shake well and add the nutmeg. Serve hot or lukewarm.

13. **Egg Nog.** —Beat the yolk of one egg, add one tablespoonful of sugar, and beat until light. Add half a glassful of milk.

Beat the white of the egg and fold it in lightly. Add ½ a teaspoonful of vanilla, some grated nutmeg or one tablespoonful of lemon juice. Shake and serve.

14. **Custard.**—One pint scalded milk, 4 tablespoonfuls sugar, one tablespoonful cornstarch, ¼ teaspoonful salt, ½ teaspoonful flavoring, one egg or 2 yolks.

Mix sugar, cornstarch and salt; add egg slightly beaten, then the milk, stirring constantly. Cook in double boiler until mixture thickens slightly. Strain, cool and flavor.

15. **Junket Custard.**—Take one cup of tepid milk, add 2 tablespoonfuls of sugar and ¼ of a junket tablet dissolved in a teaspoonful of water, also one teaspoonful of brandy. Shake well, pour the mixture into moulds and let stand in a cool place until firm.

16. **Lemonade or Orangeade.**—Squeeze the juice of half a lemon or orange; add 2 tablespoonfuls of sugar dissolved in a glassful of water. Mix well and serve hot or cold.

17. **Wine Jelly.**—One ounce of gelatin (½ a package), ½ a cup of cold water, 2 cups of boiling water, one cup of wine (sherry, port, claret

or Madeira) 3 tablespoonfuls of lemon juice and a cup of sugar.

Put the gelatin into cold water and let it stand 2 minutes. Add boiling water and stir until dissolved. Strain, add sugar and when cool add the wine and lemon juice. Pour into moulds and set aside in a cool place for several hours until firm. Serve cool.

18. **Currant and Raspberry.**— *Pudding* ("*Rote Grütze*").—One quart red raspberries, 1 quart red currants, 2 cups cold water, 1½ cups sugar, ¼ cup cornstarch dissolved in cold water.

Boil berries and water, strain and add sugar. Let boil and add three heaping tablespoonfuls cornstarch (dissolved in cold water). Put into small moulds and keep in a cool place until firm. Serve cool with sweet cream.

19. **Bread Soup.**—Place boiling water into a plate (⅔ full). Cut stale white bread (one or two slices) into small pieces and put them into the plate. Add butter and salt. Let it stand 5–10 minutes and serve.

20. **Oyster Stew.**—Two cups scalded milk, one pint oysters, a little pepper, ½ a teaspoonful of salt, one tablespoonful of butter.

Put the oysters and butter in a saucepan and

heat until the edges curl. Add the milk when hot and seasoning; cook one minute and serve at once.

21. **Clam broth** can be used, after boiling and seasoning same with some pepper and salt.

22. **Clam Boullion.**—Three-fourths cup cold water, ½ cup clam broth, ⅛ cup scalded milk, and ½ teaspoonful of butter. Salt, pepper, celery sauce, white of egg or whipped cream.

Blend the water and clam broth, heat to the boiling point; add the scalded milk and the butter, and stir well; season with salt, pepper and celery sauce. Add a small quantity of cracker crumbs to thicken it. Serve in hot bouillon cups and garnish with two teaspoonfuls of whipped cream or well-beaten white of egg.

23. **Calf's Brain Soup.**—One calf's brain is put into cold water for one hour; the water is then poured off, and the brain washed with another portion of water. The brain is thereupon boiled for one hour either in bouillon or saltwater and put through a colander. The mush can be diluted with bouillon, boiled over again and served. The yolk of an egg mixed into it makes a pleasant addition to this dish.

24. **Jellied Chicken.**—Place chicken on fire as for fricassee; when done remove skin and chop

meat very fine, add liquor the chicken was boiled in, season well and let come to a boil. Take about a tablespoonful of gelatine soaked and two tablespoonfuls of cream. Put in mold and stand in ice box.

25. **Milk Toast.**—Toast several slices of bread to a delicate brown. Then season scalding hot milk with a little salt, and pour it over the toasted bread.

26. **Zwieback** (Meaning Twice Baked).—Cut white bread into slices about ½ an inch thick; then bake them on low fire until nicely brown, almost all the way through. Keep in cool place.

Eggs may be eaten raw from the shell, cuddled, soft boiled, poached or scrambled with butter. Hard boiled eggs are appropriate in special cases (hyperchlorhydria and hypersecretion).

Meats (chicken, squab, lamb, beef; fish: trout, pike, pickerel, bass, etc.) should always be tender. They may be served broiled, boiled or fried with some butter. Scraped beef is occasionally given raw, spread on white bread or toast with some seasoning.

Measures to increase or *decrease* the *nutritive value of some food articles.* The nutritive value of some food articles may be increased by con-

centration. Thus milk may be made more nutritious by evaporation (boiling down to ⅔ its bulk). Again the food value may be augmented by the incorporation of additional nutritive material into the food articles. Butter, cream, fats, oil, sugar, honey, syrup usually serve this purpose.

With the same object in view raw eggs and also lactose are frequently added to beverages and soups with advantage. In conditions in which exclusively liquid food is indicated or feasible sufficient nutrition is hardly possible without these additions. The diet in these cases usually consists of milk, raw eggs beaten up in it or in bouillon, coffee with sugar and egg, kumyss, tea with sugar and milk or cream. Lactose can be added to the milk or to lemonade in considerable quantity (half an ounce to an ounce of lactose to a glassful of milk or lemonade) without interfering with the taste. Butter can be added to the eggs (one minute boiled), and cream to milk and soups, raising the caloric value quite extensively.

At times it is requisite to diminish the nutritive value of a food article or to prepare it in such a

way that some of its special ingredients that are not desirable should be detracted.

The nutritive value of many foods can be lessened by dilution, or by separating and taking away some of their ingredients. Thus milk can be diluted with water, or the milk may be skimmed and deprived of its usual content of cream. Meat boiled in water will lose its soluble albumin and extractive matter (purin bodies) imparting it to the fluid. The latter becomes richer in nutritive material (soup), while the meat is thereby impoverished. Vegetables when steamed retain all their nutritive ingredients, while when boiled in water, lose part of their starch and mineral salts.

These points are utilized in the dietetic management of the patients. In diabetes, for instance, green vegetables are thrice or twice boiled in water and given strained without the fluid, in order to lessen the carbohydrate content of these articles. Again soup meat (the latter boiled for quite a while in plenty of water) may be employed with advantage in high blood pressure cases, for the meat is then deprived of all its extractive material

INDEX